

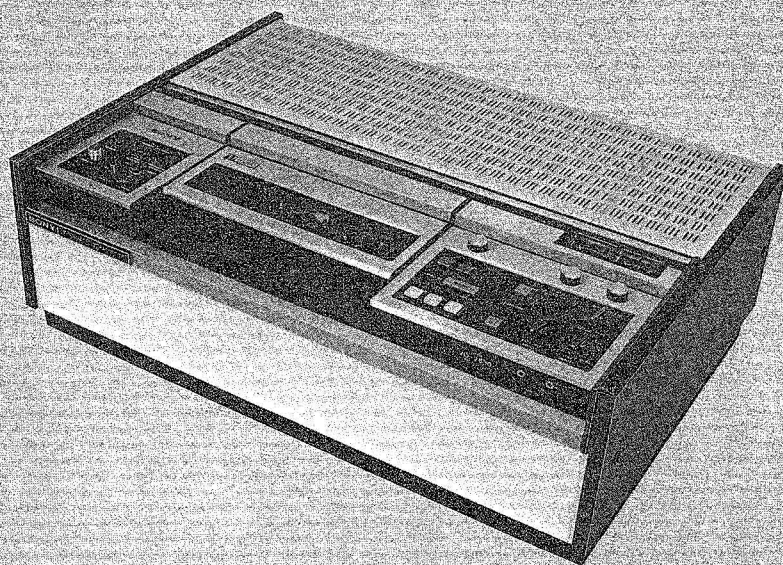


VIDEOCASSETTE RECORDER

V0-2630

AEP Serial No. 10,001 to 30,400
UK Serial No. 10,001 to 14,900

9045



SONY[®]

SERVICE MANUAL

SPECIFICATIONS

GENERAL

Video recording system:	Rotary two-head helical scanning Luminance: fm recording Colour signal: converted subcarrier direct recording
Video signal system:	Recording: CCIR standards, PAL/SECAM colour system Playback: CCIR standards, PAL/SECAM colour system, NTSC (modified) colour signal
Storage temperature:	-10°C to 60°C (14°F to 140°F)
Operating temperature:	5°C to 40°C (41°F to 104°F)
RF output signal:	Selected operating channel of the RF unit, standard asymmetrical aerial connecting socket
Power requirements:	100, 110, 120, 127, 220, 240V ac ± 10% (selectable) 50 or 60Hz ± 0.5%
Power consumption:	140W
Power output:	6.5V max. 0.6A dc (REMOTE connector pin-1)
Weight:	approximately 32.5kg (71 lb 10 oz)
Dimensions:	approximately 591 x 224 x 416mm (23 ¹ / ₄ x 8 ⁷ / ₈ x 16 ³ / ₈ inches) (w/h/d)

VIDEO

Input:	1.0Vp-p +1.0Vp-p, 75 ohms, -0.5Vp-p, 75 ohms, unbalanced, sync negative LINE: BNC connector TV: 8-pin connector
Output:	1.0Vp-p ± 0.2Vp-p, 75 ohms, unbalanced, sync negative LINE: BNC connector TV: 8-pin connector
Horizontal resolution:	Monochrome: 300 lines Colour: 250 lines
Signal-to-noise ratio:	Better than 45 dB

AUDIO

Input:	LINE: -10dB, 100kohms, unbalanced, phone jack MIC: -60dB, suitable for low- impedance microphone, unbalanced, minijack TV (only CH-2): -20dB, 100kohms, unbalanced, 8-pin connector
Output:	LINE: less than 2kohms, -5dB (100kohm load), unbalanced, phono jack MONITOR: less than 2kohms, -5dB (100kohm load), unbalanced, minijack TV: less than 2kohms, -5dB (100kohm load), unbalanced, 8-pin connector HEADPHONES: 8ohms, phone jack
Frequency response:	50 to 12000Hz
Signal-to-noise ratio:	Better than 45dB (both channels, 3% distortion at 1kHz)

TAPE TRANSPORT

Tape speed:	9.53cm/sec. (3 ³ / ₄ ips)
Wow and flutter:	Less than 0.2% rms
Recording/playback time:	60 min. (for Sony KCA-60, KC-60)
Fast forward time:	Within 6min. (for Sony KCA-60, KC-60)
Rewind time:	Within 4min. (for Sony KCA-60, KC-60)

SPECIAL FUNCTIONS

Pause mode:	A still picture is displayed in the pause mode with Sony KCA or KCS type videocassette
Timer operation:	Possible (with an optional timer record- ing adaptor)
Remote control:	Possible (with Sony model RM-420 or RM-410 remote control)

ACCESSORIES SUPPLIED

AC power cord
Dust cover
Timer recording adaptor FA-20

OPTIONAL ACCESSORIES

RM-420 remote control
RM-410 remote control
VDC-5 dubbing cable
RFU-220 series or RFU-250 series RF modulator
ANS-31 antenna selector
TU-1100 series TV video tuner
DXC-, AVC-series video cameras
KC-1C cleaning cassette
PVM-1850PS colour monitor
PVM-2750PS colour monitor

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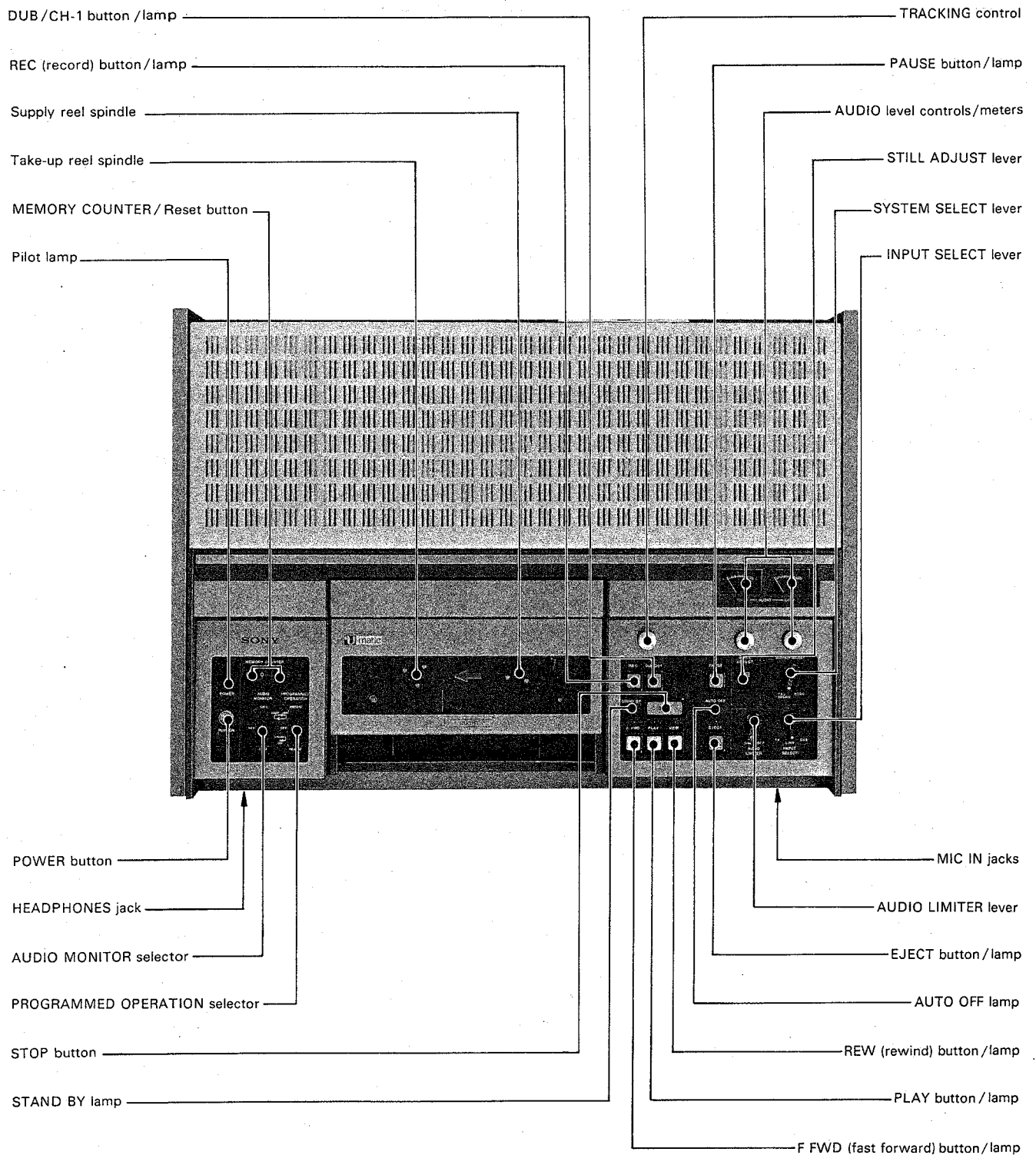
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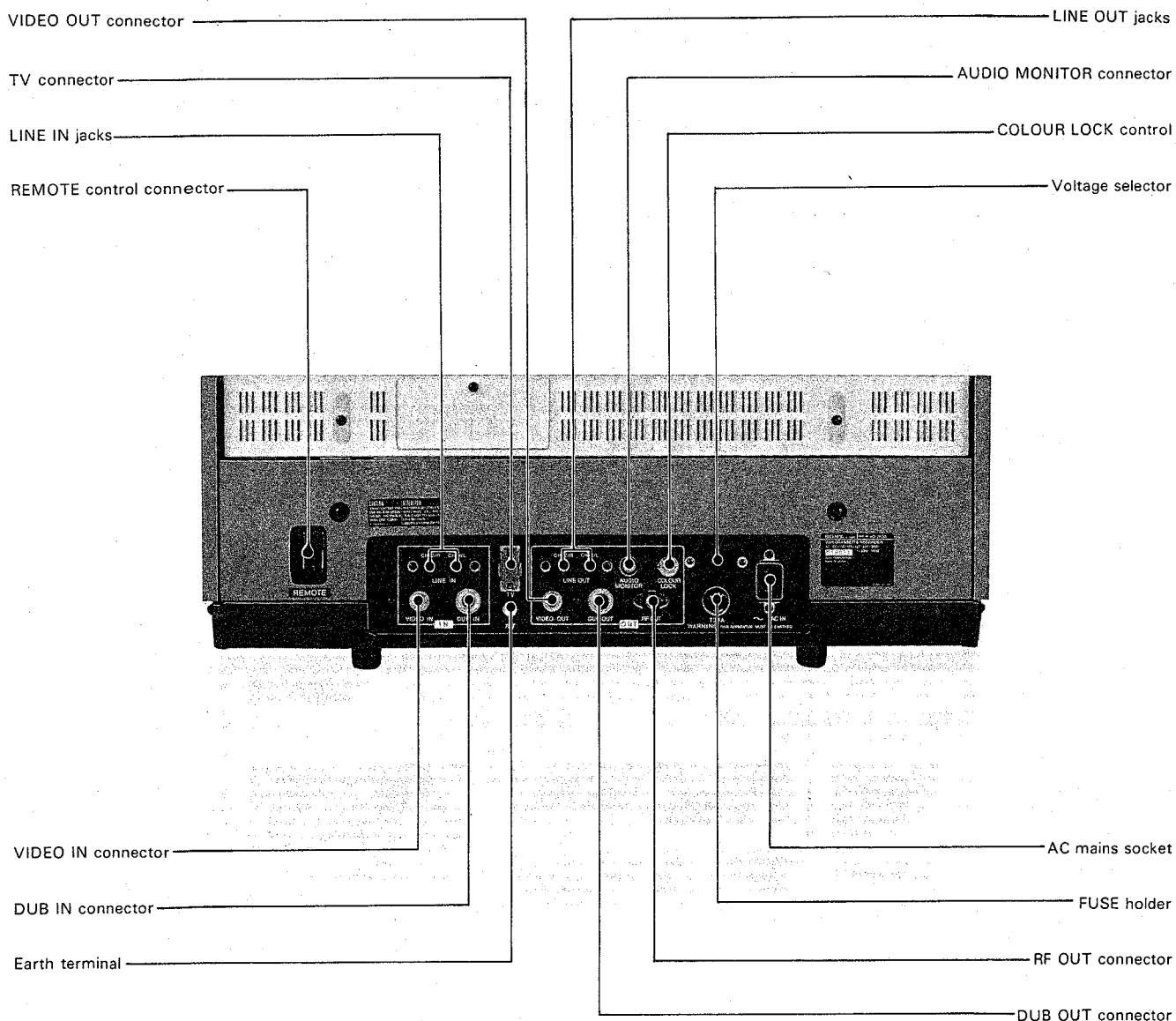
SECTION 1

CAUTIONS AND OTHER INFORMATION

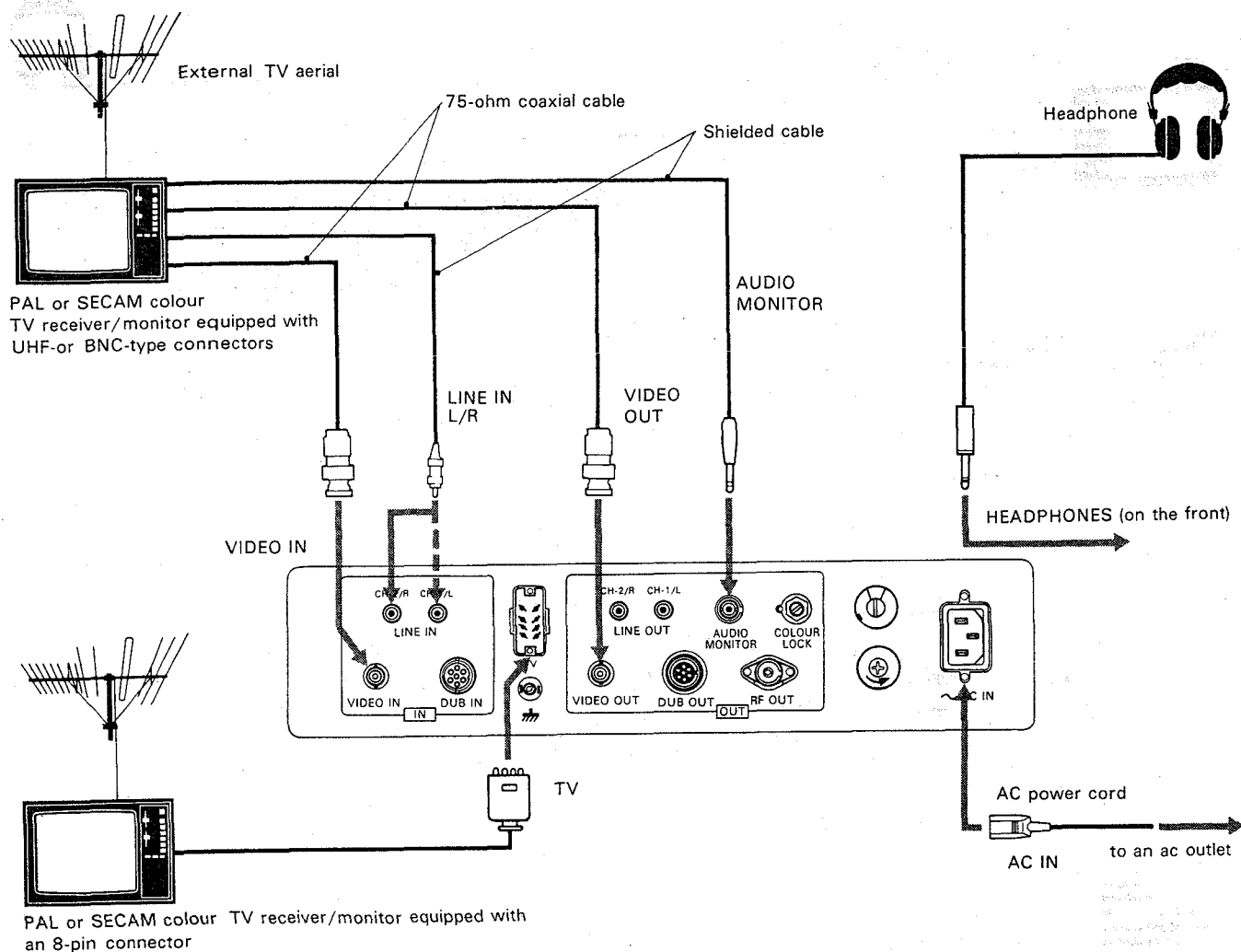
1-1. LOCATION OF PARTS AND CONTROLS



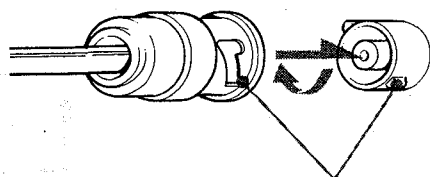
Connector panel



1-2. RECORDING TV PROGRAMMES

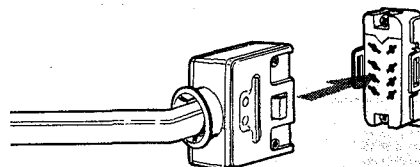


BNC connector



Insert by engaging the slot with the projection and tighten the knurled locking ring clockwise.

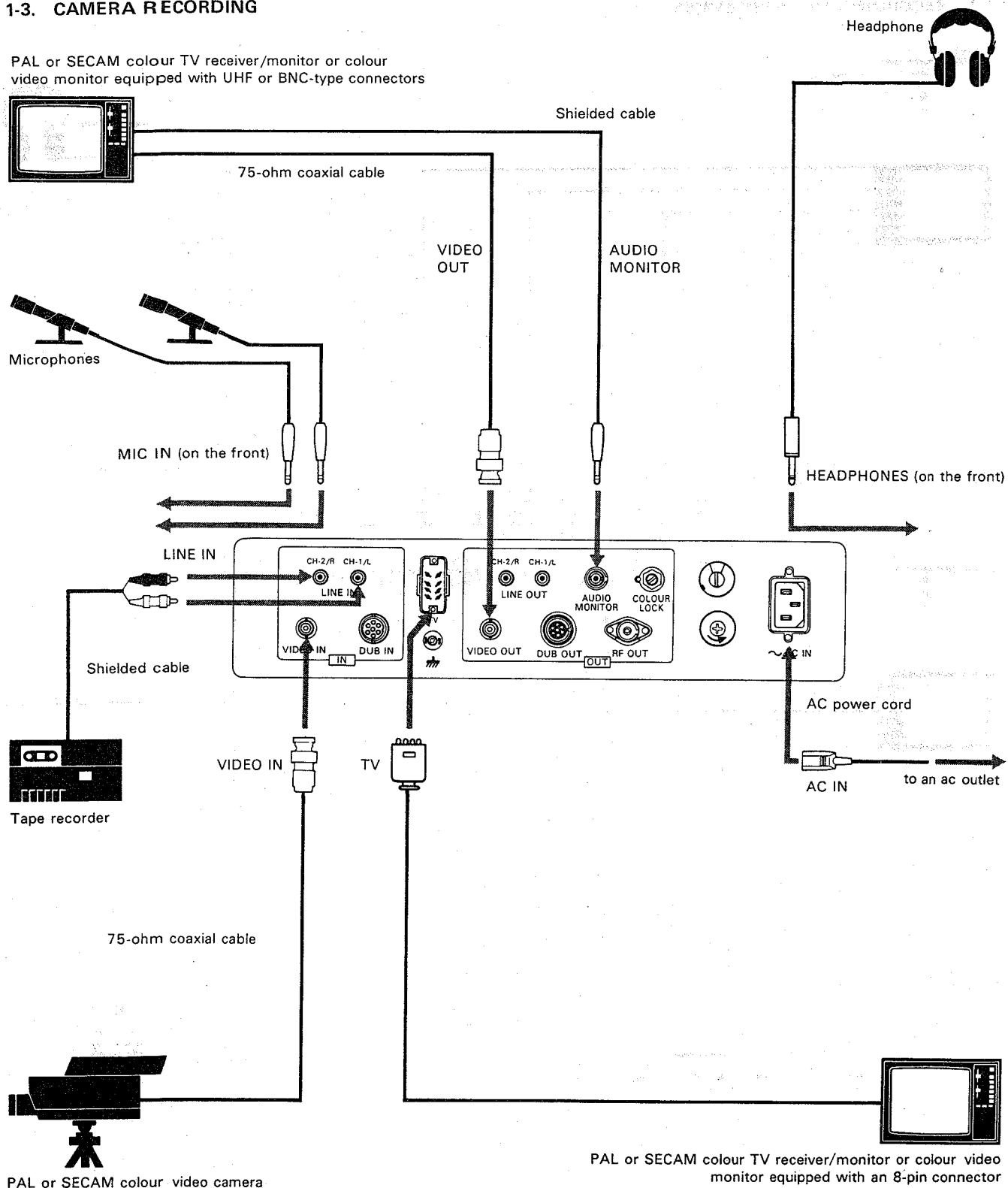
8-pin connector



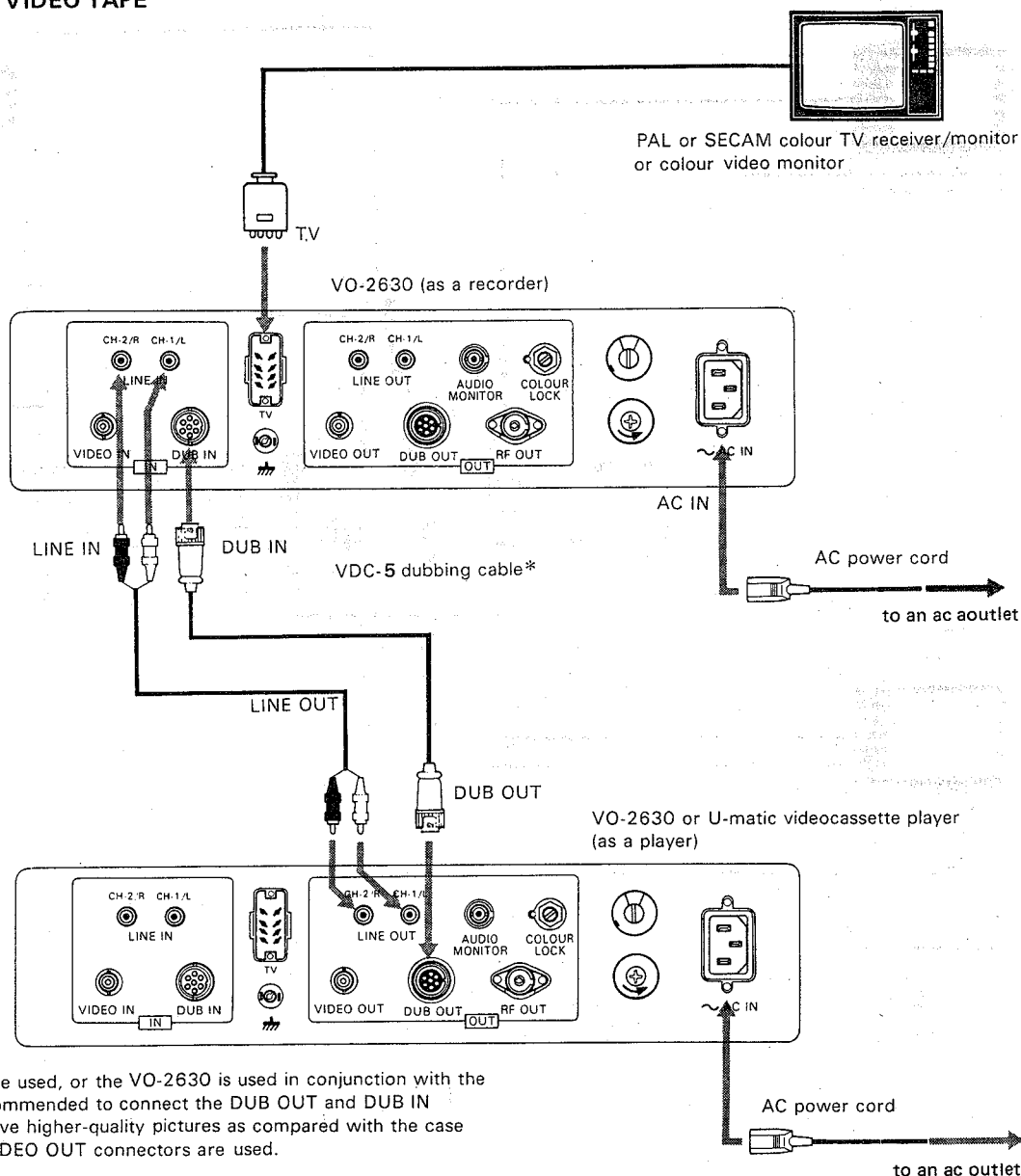
When connecting the cable, observe the direction. To remove, press the buttons on the connector.

1-3. CAMERA RECORDING

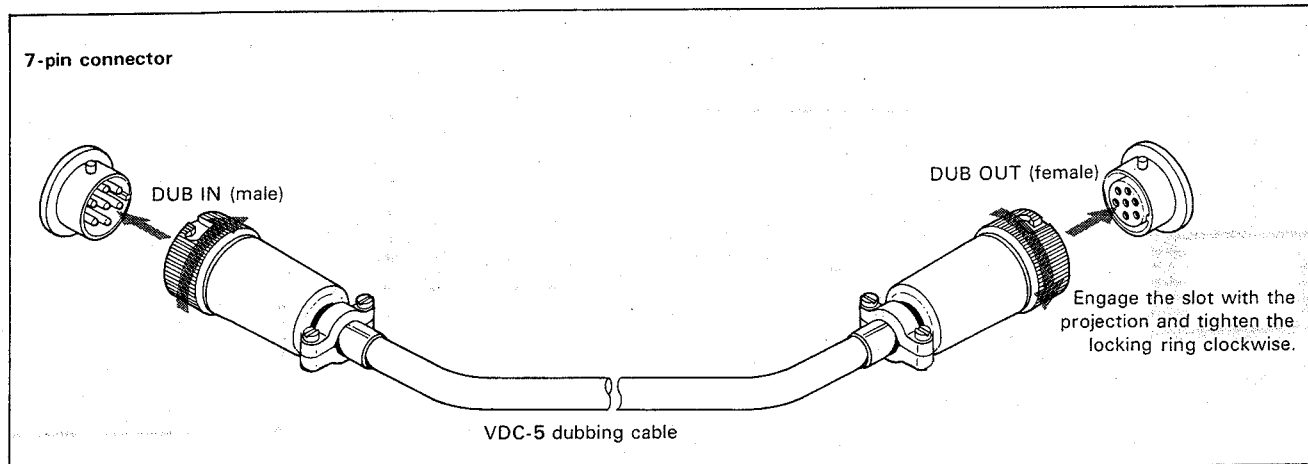
PAL or SECAM colour TV receiver/monitor or colour video monitor equipped with UHF or BNC-type connectors



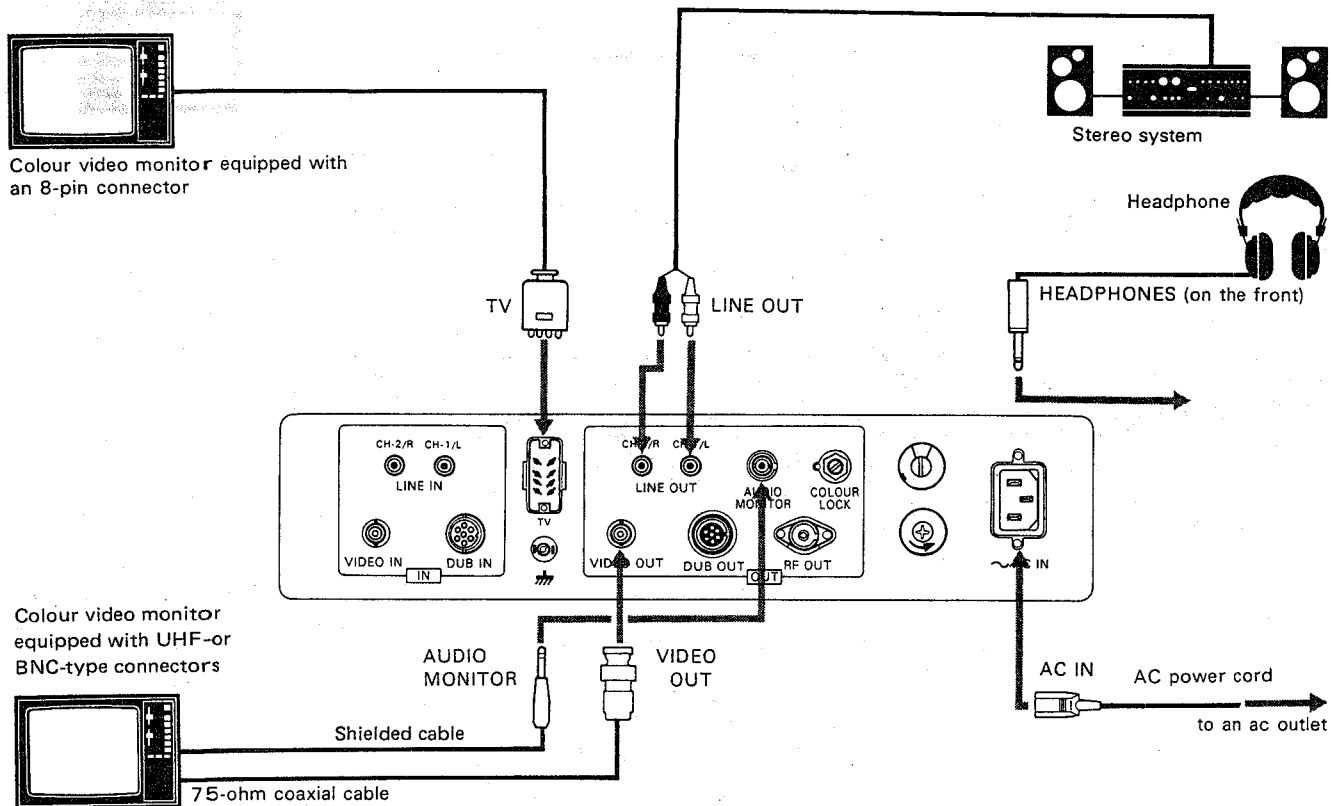
1-4. DUPLICATING A VIDEO TAPE



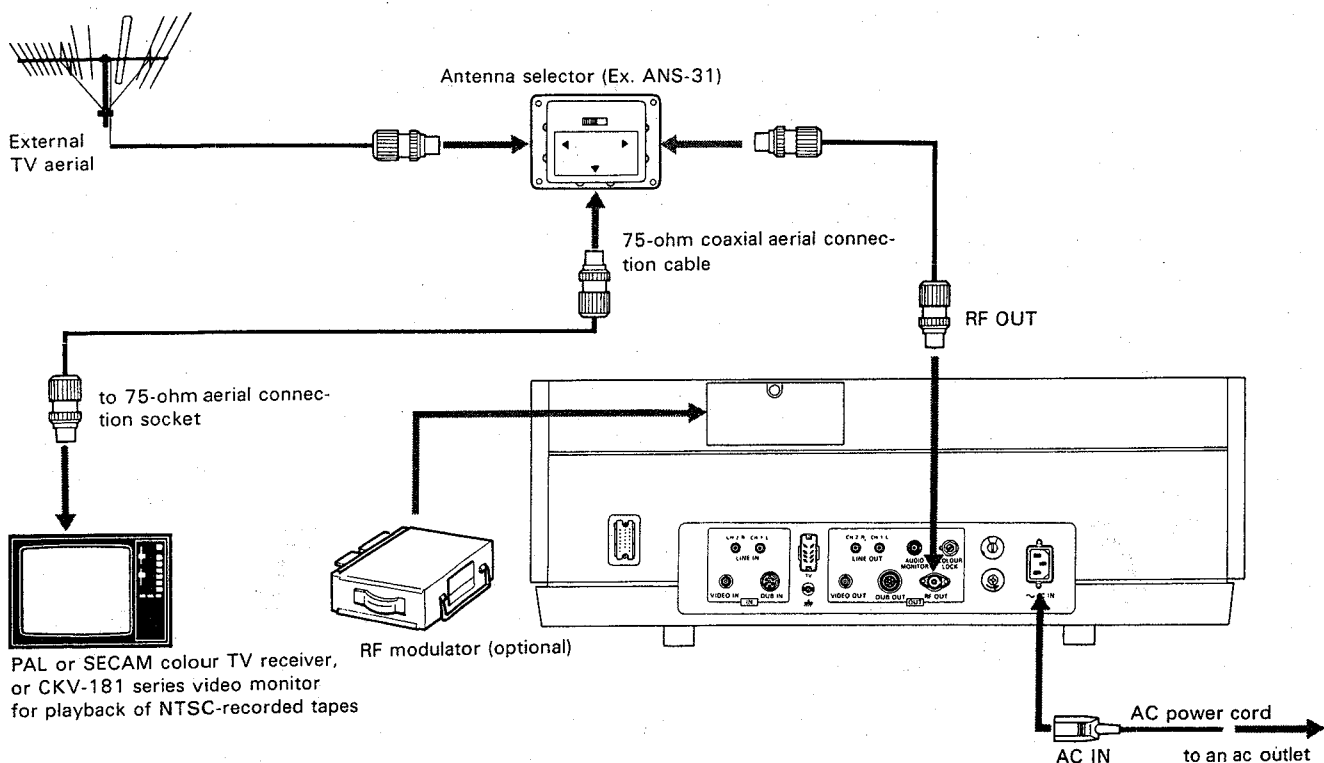
* When two VO-2630s are used, or the VO-2630 is used in conjunction with the VP-2030 player, it is recommended to connect the DUB OUT and DUB IN connectors, which may give higher-quality pictures as compared with the case that the VIDEO IN and VIDEO OUT connectors are used.



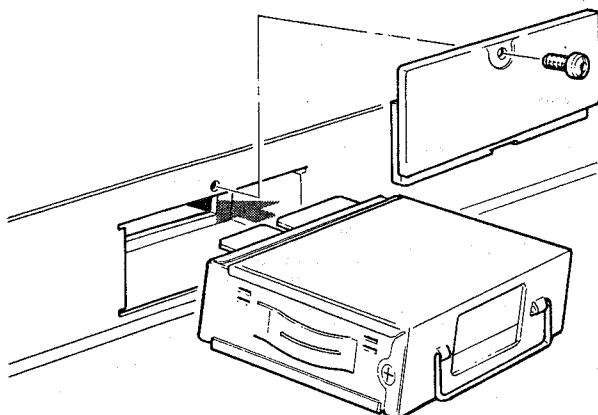
1-5. PLAYBACK USING A PROFESSIONAL VIDEO MONITOR



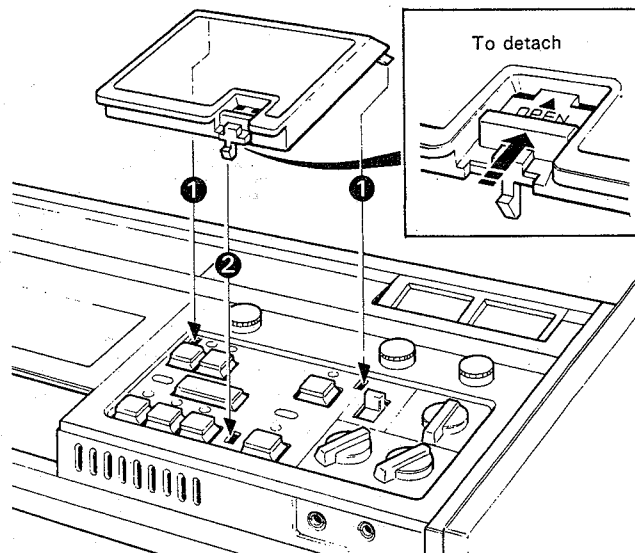
1-6. PLAYBACK USING A REGULAR TV RECEIVER



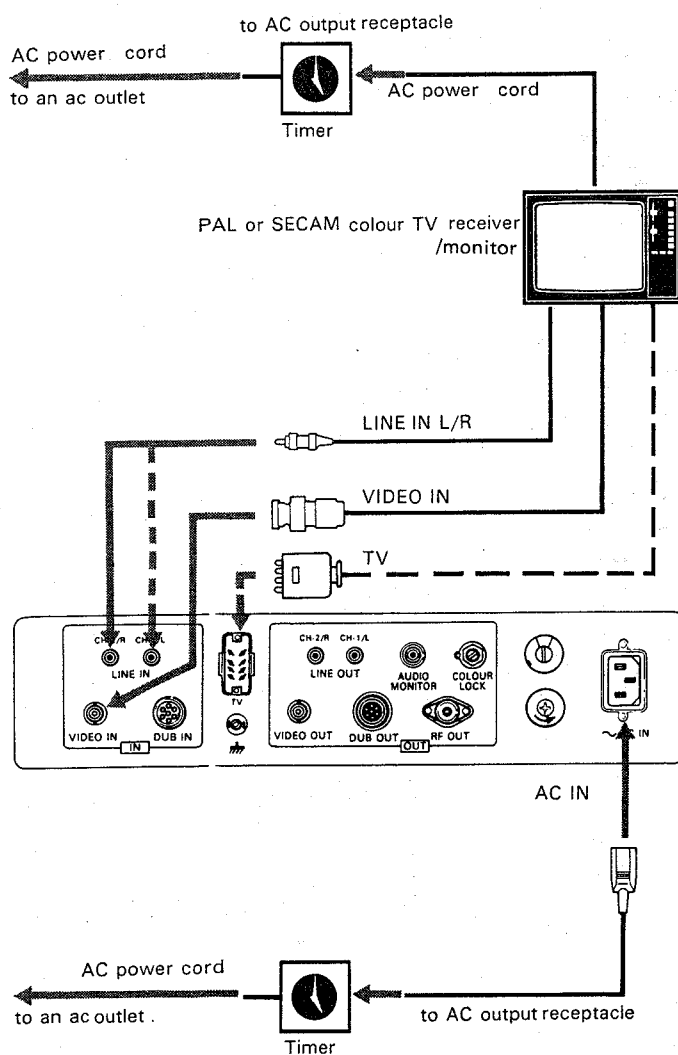
1-7. RF MODULATOR INSTALLATION



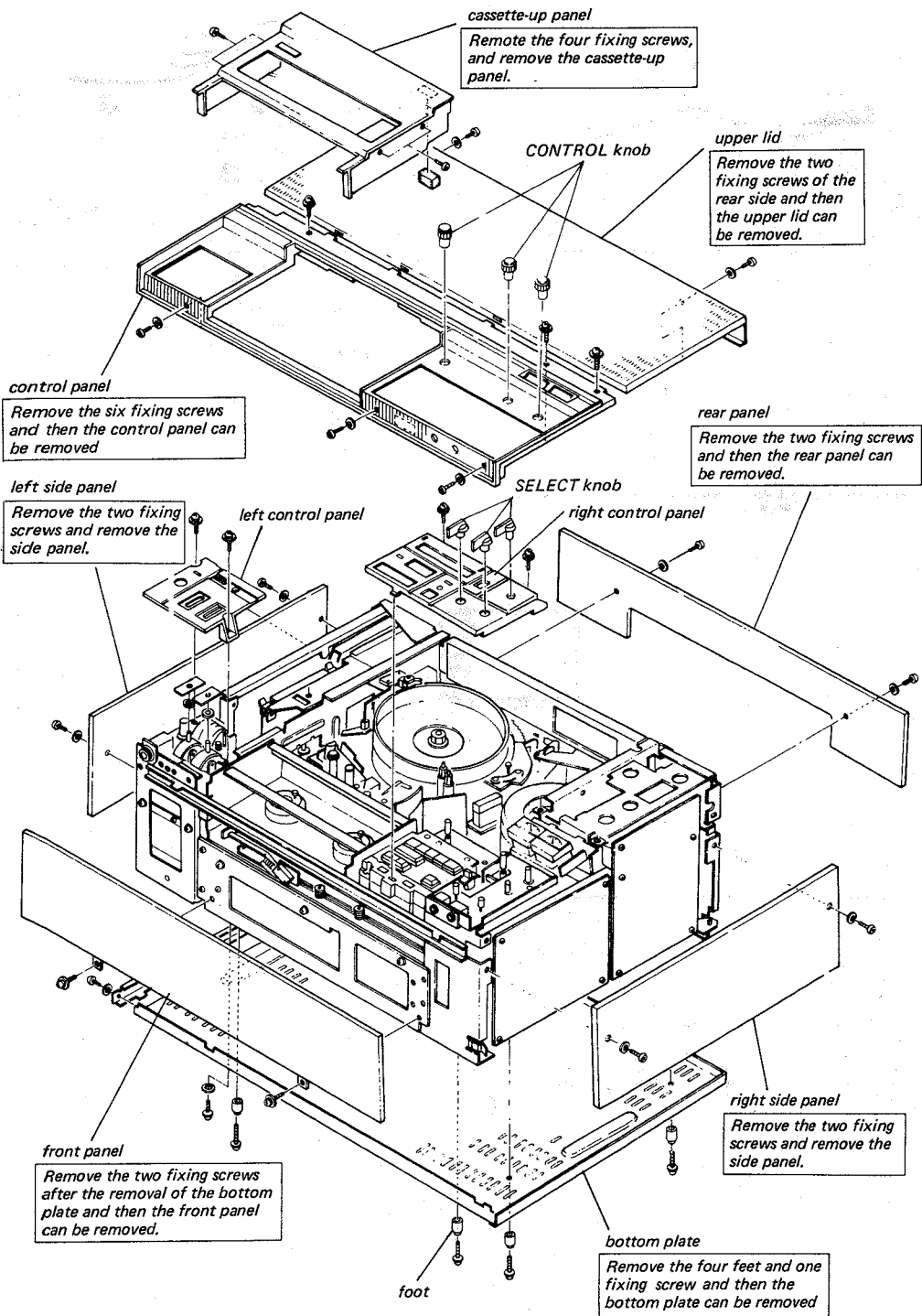
1-9. FA-20 INSTALLATION



1-8. TIMER OPERATION



1-10. DISASSEMBLY OF CABINET



1-11. SPARE PARTS

1-11-1. Safety Related Component Warning

Components identified by shading and **A** marked on the schematic diagrams, exploded views and electrical spare parts list are critical to safe operation. Replace these components with Sony parts whose part numbers appear as shown in this manual or in service bulletins and service manual supplements published by Sony.

1-11-2.

Replace Parts that are supplied from Sony Parts Center can sometimes have different shape and external appearance than what are actually used in equipment. This is due to "accommodating the improved parts and/or engineering changes" or "standardization of genuine parts"

This manual's exploded views and electrical spare parts list are indicating the parts numbers of "the standardized genuine parts at present".

Regarding engineering parts changes in our engineering department, refer Sony service bulletins and service manual supplements.

1-11-3.

Printed Components in Bold-Face type on the exploded views and electrical spare parts list are normally stocked for replacement purposes. The remaining parts are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

1-12. ALIGNMENT TAPE

Playback performance of the VO-2630 can be checked and adjusted by using any of the PAL, SECAM, or NTSC format alignment tape.

It is recommended to adjust the machine with the PAL or SECAM format alignment tape.

If the PAL or SECAM format alignment tape is not available by all means while the NTSC format alignment tape is on hand, adjust the machine by following the adjustment procedure under the NTSC column.

- (i) The PAL alignment tape is required for the function check and adjustment in the PAL system;

- type RR5-1S, PAL (SONY Part No. 8-960-015-61).

Video	Audio	Time
Monoscope Signal	3kHz, 0dB	5 min.
PAL Colour-bar signal (75%)	3kHz, 0dB	5 min.
R-F Sweep signal	3kHz, 0dB	5 min.
Control Signal only	1kHz, 0dB	2.5min.
Control Signal only	10kHz, -10dB	2.5min.

- (ii) The SECAM alignment tape is required for the function check and adjustment in the SECAM system;

- type RR5-1S, PAL (SONY Part No. 8-960-015-61)
(Pal system colour-bar recorded on this tape is not utilized for the adjustment.)
- type RR4-7S, SECAM Colour-bar
(SONY Part No. 8-960-014-87)

Video	Audio	Time
SECAM Colour-bar Signal	No signal	15 min.

- (iii) The NTSC alignment tape is required for the function check and adjustment in the case of the NTSC system;

- type RR5-1S (SONY Part No. 8-960-015-01)

Video	Audio	Time
Monoscope Signal	3kHz, 0dB	5 min.
NTSC Colour-bar Signal (75%)	3kHz, 0dB	5 min.
R-F Sweep Signal	3kHz, 0dB	5 min.
Control Signal only	1kHz, 0dB	2.5 min.
Control Signal only	10kHz, -10dB	2.5 min.

1-13. MONITOR TV

The monitor TV to be connected to the VO-2630 must be the one which conforms to the signal system inputted to the machine or a signal system recorded on a tape to be played back.

SELECTION OF MONITOR

Signal standard	Operation	Monitor (Ex.)
PAL colour	off-the-air recording (when a separate tuner is used, refer to the next column)	PAL receiver/monitor such as: Sony CVM-1310 series, or Sony CVM-1810 series which has an appropriate tuner for your local TV broadcasts.
	other recording and playback	Same as above, plus PAL video monitor such as Sony PVM-1300E (with PAL board) and PAL TV receiver (with an appropriate RF unit)
SECAM colour	off-the-air recording (when a separate tuner is used, refer to the next column)	SECAM receiver/monitor such as: Sony CVM-1830SE which has an appropriate tuner for your local TV broadcasts
	other recording and playback	Same as above plus SECAM video monitor such as: Sony PVM-1300E (with SECAM board) and SECAM TV receiver (with an appropriate RF unit)
NTSC colour	playback only	Special Sony monitor which accepts the modified NTSC* signal, such as: CVM-1310 series, CVM-1810 series and CKV-181 series. *Regular NTSC monitors do not reproduce proper colour.
625 line/50 field monochrome	record/playback	625line/50field monochrome monitor
525line/60field monochrome	playback	525line/60field monochrome monitor

TRI-MODE MONITOR

PVM-1850PS
PVM-2750PS

These monitor can reproduce PAL, SECAM and modified NTSC colour.

1-14. ADAPTATION TO YOUR MAINS SUPPLY

This machine operates on either 100, 110, 120, 127, 220 or 240Vac.

Before connecting the set to a mains outlet, check that the operating voltage is identical with the voltage of your mains supply.

To reset the voltage, turn the Voltage selector screw with a coin or similar device until the correct voltage figure appears at the cutout.

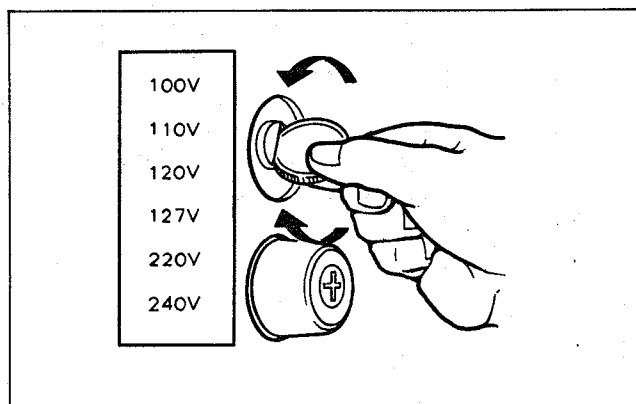


Fig. 1-2. Adaptation to your mains supply

1-15. TO REMOVE THE CASSETTE COMPARTMENT MANUALLY

Normally the cassette compartment must be lifted with the EJECT button. However, if the cassette compartment cannot be lifted with the EJECT button when the power is turned on, or if you want to lift up the cassette compartment where the power is not available, you may lift it up manually as follows.

- Insert a small screwdriver or the like into the slot located at the center of the cassette compartment.
- When the tip of the screwdriver touches bottom, slide it to the right. The compartment will pop up.

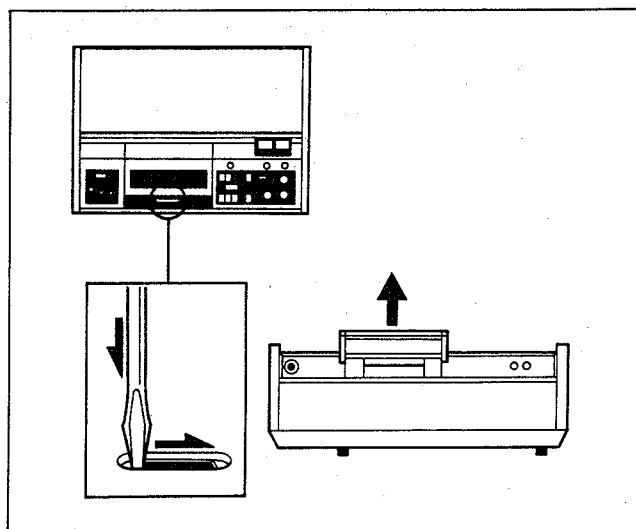


Fig. 1-3. To remove the cassette compartment manually

1-16. TO OPERATE THE MACHINE WITHOUT INSTALLING CASSETTE

It is necessary, for operating the machine without a cassette installed, that the tape end sensor and slack tape detector circuits are disabled and the cassette-up switch is placed in the ON state.

1-16-1. To Stop the Tape End Sensor Circuit

Remove the connector CN341 on the EC-1 board on the Erase Head Base and remove the connector ⑤ on the FR-1 board at the back of the left side plate as shown in Fig. 1-4.

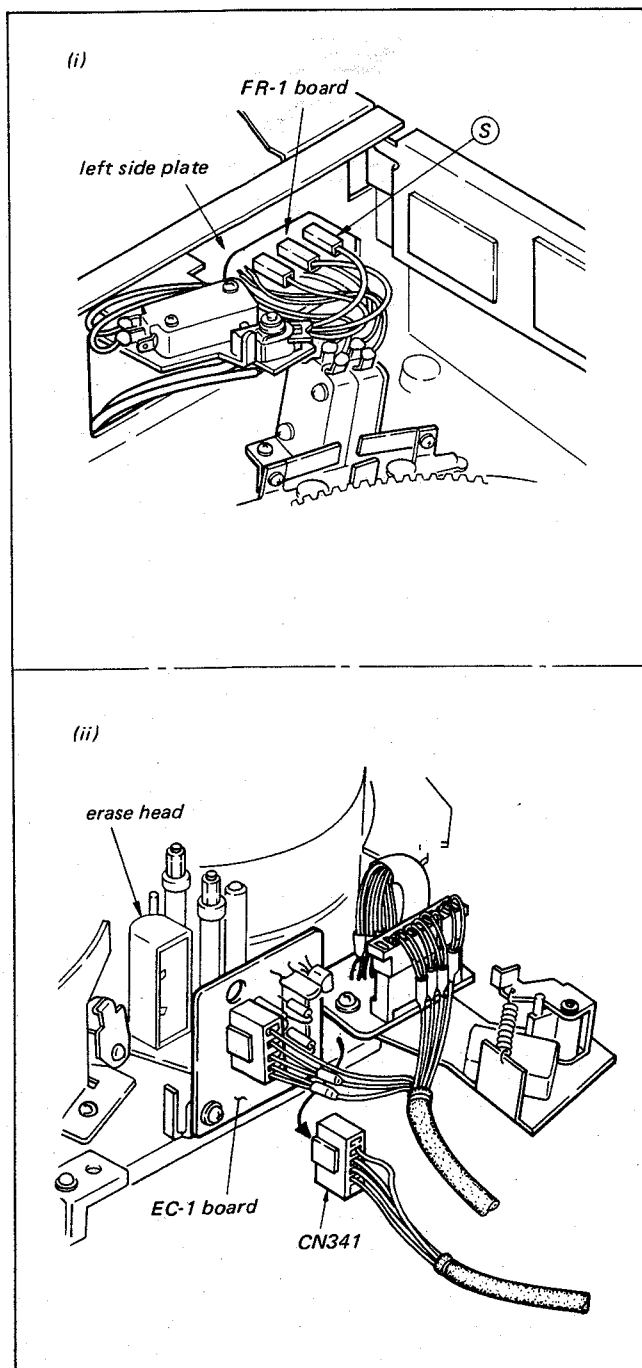


Fig. 1-4. To stop the tape end sensor circuit

1-16-2. To Stop the Tape Slack Detecting Circuit

Remove the connector CN341 on the EC-1 board on the Erase Head Base as shown in Fig. 1-4.

1-16-3. To set the Cassette-up Switch ON

Hook the cassette compartment lock lever of the cassette-up switch block as shown in Fig. 1-5 with a rubber loop on the front of the chassis, putting the cassette-up switch in ON position. (the same position as the cassette-up assembly is lowered.)

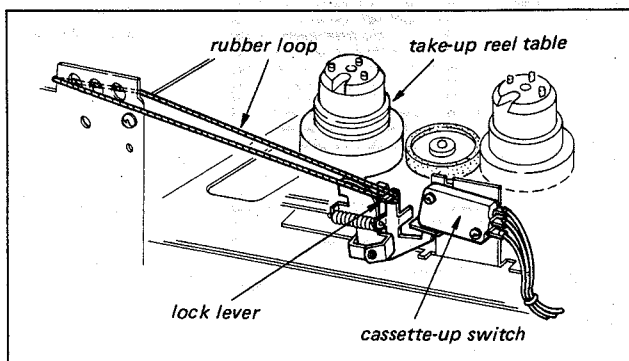


Fig. 1-5. To set the cassette-up switch ON

1-17. POWER LINE FREQUENCY CHANGE

The following items of replacements, changes and adjustment are necessary for the power line frequency change.

- Replacements and Changes;
 - (1) Motor pulley replacement
 - (2) Change of installation direction of the eccentric pulley
 - (3) Mount change of PC-2 board
 - (4) Wiring change of 4P terminal
- Checks and Adjustment;
 - (5) Tape speed adjustment (refer Section 6-11)
 - (6) Confirmation for correct playback picture by alignment tape

Description	60Hz		50Hz		speed
	Part No.	mark	Part No.	mark	
(1) Motor pulley	3-649-261-02	-02	3-649-262-02	-02	↑ increase ↓
	-12	-12	-12	-12	
	-22	-22	-22	-22	
	-32	-32	-32	-32	
	-42	-42	-42	-42	
	-52	-52	-52	-52	
	-62	-62	-62	-62	
	-72	-72	-72	-72	
	-82	-82	-81	-81	
(2) Eccentric pulley (place the pulley as shown figure)	-92	-92	-91	-91	↑ increase ↓

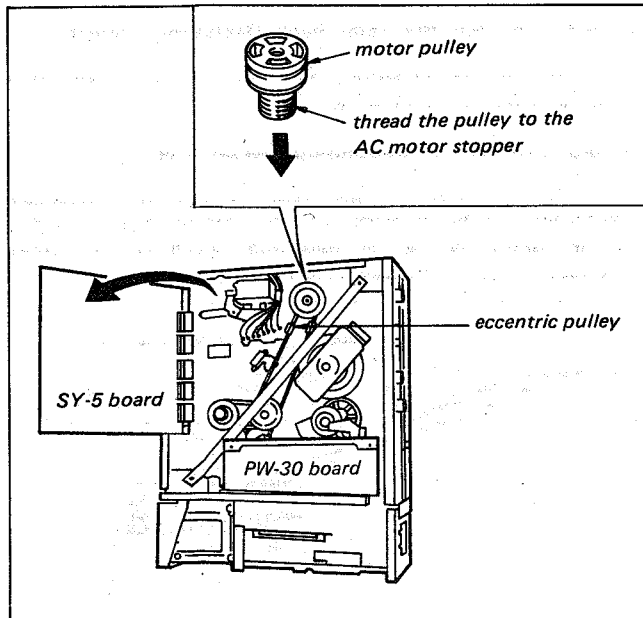


Fig. 1-6. Power line frequency change

- (3) Mount change of PC-2 board

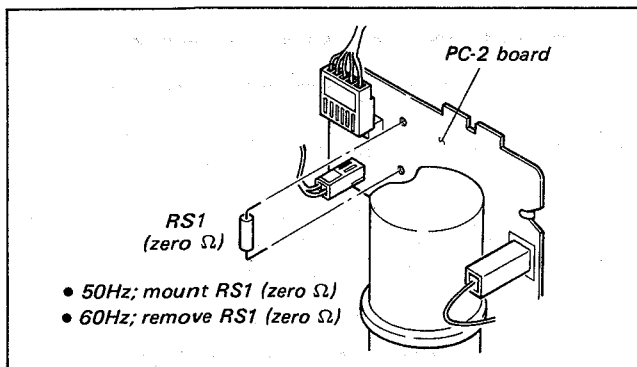


Fig. 1-7.

- (4) Wiring change of 4P terminal

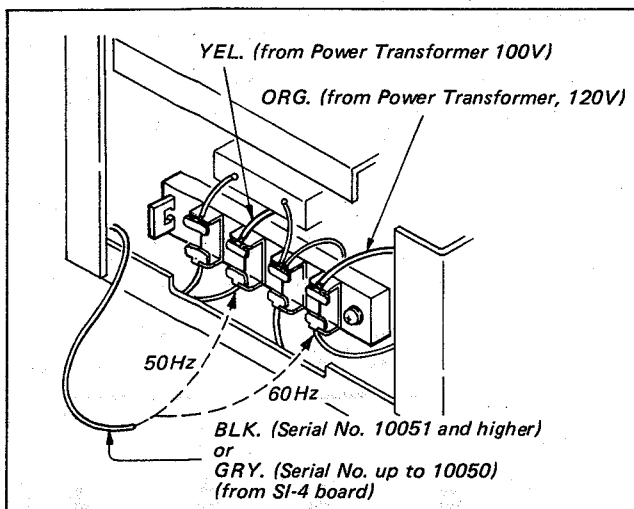
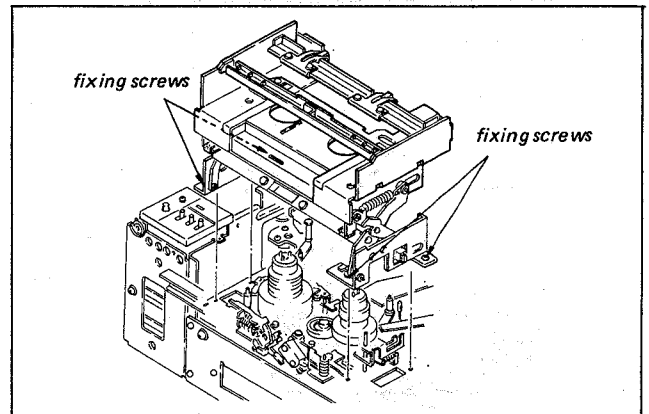


Fig. 1-8. Power line frequency change

1-18. NOTES FOR MECHANICAL ALIGNMENT

- (1) The descriptions of the main parts replacement (Section 3) and the mechanical adjustment (Sections 4 to 6) are of the procedures in the state that the cassette-up compartment is not attached to the machine. Consequently the machine's mechanism must be adjusted after the cassette-up compartment is removed. The compartment can be removed by loosening the four screws that are securing the compartment. Each of the four screws is held by a plate spring for preventing the screw from loss.



- (2) It is instructed in the description of the mechanical adjustment, to use an alignment tape for the tracking adjustment. The tape must be the RR5-1S, PAL (SONY Part No. 8-960-015-61) or the RR5-1S, NTSC (SONY Part No. 8-960-015-01). The SYSTEM SELECT switch must be set to "PAL/SECAM" when the RR5-1S, PAL is played back. It must be set to "NTSC" for the RR5-1S, NTSC. The adjustment procedure stated is the case that the RR5-1S, PAL is used.
- (3) When the tape end and tape slack sensor circuits are disabled by disconnecting the connectors as described in Section 1 thru 7 of the mechanical section adjustment, the removed connectors must be re-connected as they were after the adjustments are completed without fail. If not, the tape and the machine will be damaged.
- (4) TOTSU-type screws are used in the VO-2630. It is recommended to use the screwdriver only for this type screws for increasing work efficiency.

Screwdriver for 2.6mm	SONY Part No. 7-721-050-63
Screwdriver for 3mm	
Screwdriver for 4mm	SONY Part No. 7-721-050-64

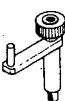
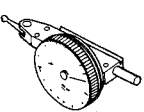
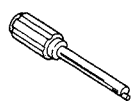
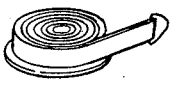
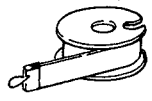
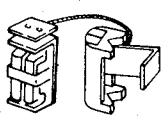
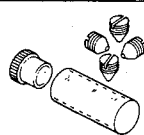
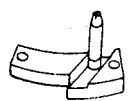
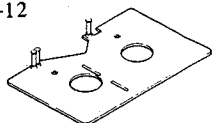
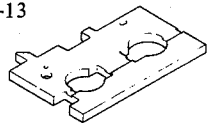
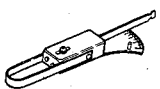
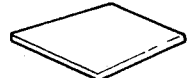
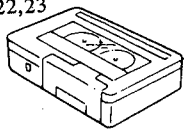
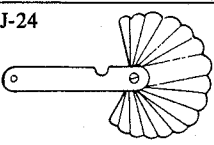
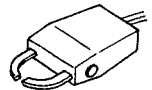
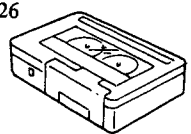
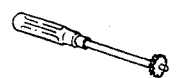
1-19. NOTES FOR ELECTRICAL ALIGNMENT

Electrical system alignment procedures are described on assumption that the mechanical system adjustments have been completed. If a suspicious point exists after the electrical system alignment, the mechanical system must be checked.

Electrical system alignment procedures are divided by systems such as power supply system, servo system, etc. The adjustment items are arranged following the adjustment sequence in each system and the adjustment must be performed one by one following the arrangement. If the adjustment order is inverted, a correct adjustment result cannot be obtained. The complete alignment of the electrical system can be accomplished only by the systematic adjustments.

1-20. JIGS REQUIRED FOR ALIGNMENT

Ref. No.	Part No.	Description	Purpose
J-1	J-600-182-0A	Drum Eccentricity Gauge (3)	Upper Drum Eccentricity Adj.
J-2	J-600-183-0A	Drum Eccentricity Gauge (2)	
J-3	J-600-184-0A	Drum Eccentricity Gauge (1)	
J-4	J-600-193-0A	Drum Eccentricity Gauge (4)	
J-5	3-702-390-01	Eccentric Screwdriver (4 ϕ)	Position Adj.
J-6	3-702-391-01	Eccentric Screwdriver (5 ϕ)	Audio/CTL Head Position Adj.
J-7	8-899-999-53 (3-702-215-01)	100mm dia Torque Measurement Tape	Measurement of Torque
J-8	8-899-999-51 (3-702-213-01)	38mm dia Torque Measurement Tape	FWD Back Tension Adj.
J-9	J-6001-085-A	Pinch lever Adjustment Jig	Pinch Lever Right Angle Adj.
J-10	J-600-229-0A	Dihedral Adjusting Screw	Video Head Dihedral Adj.
J-11	3-702-394-01	FWD Back Tension Measurement Jig	FWD Back Tension Adj.
J-12	3-702-216-01	Back Tension Adjustment Jig	Back Tension Adj.
J-13	3-702-398-01	Position Jig	Tape Guide Position & Reel Table Height Adj.
J-14	3-702-397-01	Reel Table Height Adj. Jig	Reel Table Height Adj.
J-15	7-732-050-20	Tension Scale (50g Full Scale)	Measurement of Back Tension & Torque
J-16	7-732-050-30	Tension Scale (100g Full Scale)	
J-17	7-732-050-40	Tension Scale (200g Full Scale)	
J-18	7-732-050-50	Tension Scale (500g Full Scale)	
J-19	2-034-697-00	Chamois	Cleaning
J-20	Y-2031-001-0	Cleaning Fluid	Cleaning
J-21	8-960-015-61	Alignment Tape RR5-1S PAL	For PAL System & SECAM System
J-22	8-960-014-87	Alignment Tape RR4-7S SECAM Colour-bar	For SECAM System
J-23	8-960-015-01	Alignment Tape RR5-1S, NTSC	For NTSC System
J-24	9-911-053-00	Thickness Gauge	For Clearance Check
J-25	Standard products	Head Demagnetizer HE-2 or HE-3	Degaussing of Heads
J-26	Standard products	Video Cassette Tape (KCA-60)	Overall Alignment
J-27	J-600-906-0A	Screwdriver with gear	Tension Arm Position Adj.

J-1 	J-2 	J-3 	J-4 	J-5, 6 
J-7 	J-8 	J-9 	J-10 	J-11 
J-12 	J-13 	J-14 	J-15, 16, 17, 18 	J-19 
J-20 	J-21, 22, 23 	J-24 	J-25 	J-26 
J-27 				



SECTION 2

PERIODIC CHECK AND MAINTENANCE

It is recommended to follow the subsequent Periodic Check and Maintenance in order to obtain the maximum performance and full functions of the machine and to obtain longer tape life.

2-1. CHECK PROCEDURE AFTER COMPLETION OF MACHINE REPAIR WORK

Perform the following maintenance after the repair without regarding the operating hours of the machine.

(1) Cleaning of Video Heads.

- Press chamois (Jig Ref. No. J-19) moistened with the cleaning fluid (Jig Ref. No. J-20) and turn the upper drum slowly with the hand, cleaning the heads. (Never turn the motor by the electric power for the cleaning.)
- Never move the chamois in the vertical direction of the head tip in the cleaning. It tends to damage the head tips.

(2) Cleaning the tape running system.

- Wipe the tape bearing surface (of the tape guide, upper/lower drum, stationary heads, capstan shaft, pinch roller, etc) with a piece of chamois saturated with the cleaning fluid.

(3) Cleaning of drive system.

- Wipe the drive system (such as belt, idler, and reel table surface) with a piece of chamois saturated with the cleaning fluid.

(4) Measurement of the Overall Take-up Torque.

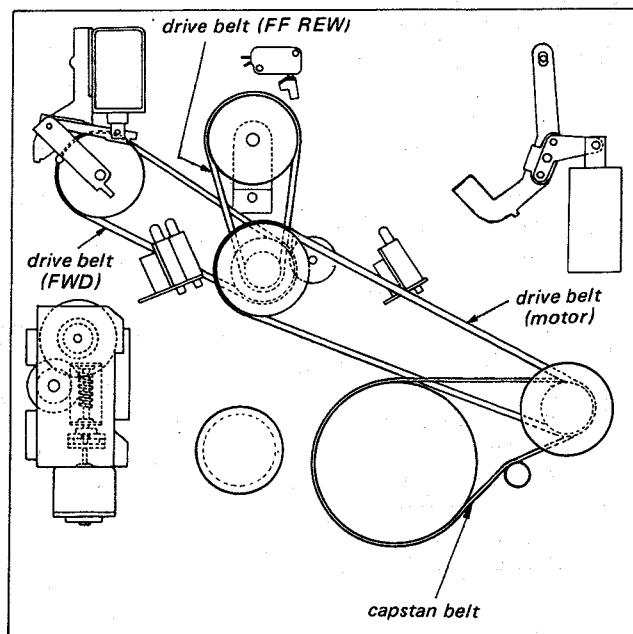
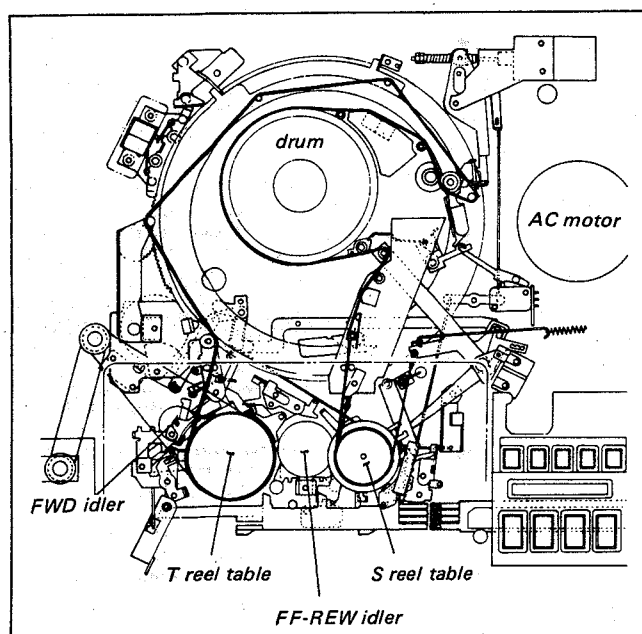
2-2. PERIODIC CHECK AND MAINTENANCE

It is recommended to the following check and maintenance regarding of the operating hours.

○ : Cleaning ⊙ : Lubrication ★ : replacement ◇ : check

OPERATING HOURS (H)		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	REMARKS
ITEM												
Tape Path system	Tape path cleaning	○	○	○	○	○	○	○	○	○	○	Perform whenever repair work is attempted.
	Audio/CTL head cleaning and degaussing											
	Video heads cleaning, degaussing and replace	○	★	○	★	○	★	○	★	○	★	Life of video heads are effected extensively by operating ambient condition.
Bearing system	Lubrication to eccentric pulley of drive belt	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	• Remove the pulley or reel table. • Apply a drop of SONY oil after cleaning of the shaft.
	Lubrication to eccentric pulley of capstan belt.											
	Lubrication to shaft of take-up reel table and reel table replacement	—	⊙	—	★	—	⊙	—	★	—	⊙	
	Lubrication to shaft of supply reel table and reel table replacement	—	⊙	—	⊙	—	⊙	—	★	—	⊙	
	Lubrication to capstan holder bearing	—	⊙	—	⊙	—	⊙	—	⊙	—	⊙	• Apply a drop of SONY oil to capstan holder.
Drive/torque system	Pinch roller cleaning and replace											• Clean the idler with a piece of cloth saturated with the cleaning fluid.
	FWD idler cleaning and replace	○	○	○	○	○	○	○	★	○	○	
	FF-REW idler cleaning and replace											
	Capstan belt cleaning and replace											• Clean the belt with a piece of cloth saturated with the cleaning fluid. • Perform whenever repair work made other than left column. • Replace according to operating hours as shown in left column, or after every 2 years.
	Drive belt (MOTOR) cleaning and replace	○	○	○	★	○	○	○	★	○	○	
	Drive belt (FF-REW) cleaning and replace											
	Drive belt (FWD) cleaning and replace											
	Solenoid iron core cleaning	—	—	—	○	—	—	—	○	—	—	• Clean the solenoid iron core and inside the coil with dry cloth.

		OPERATING HOURS (H)										REMARKS
ITEM		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	
Function check	Excessive noise sound	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	• Adjust or replace parts causing noise.
	Measurement of overall take-up torque	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	• Measure according to sec. 5-6 Spec. less than 50g (x 5cm)
	Measurement of REW torque	—	—	—	◇	—	—	—	◇	—	—	• Measure according to sec. 5-7 Spec. 240 ~ 350g (x 5cm)
	Measurement of FWD back tension	—	◇	—	◇	—	◇	—	◇	—	◇	• Measure according to sec. 5-4 Spec. 85 ~ 90g (with jig tape)
	Measurement of REW back tension	—	—	—	◇	—	—	—	◇	—	—	• Measure according to sec. 5-3 Spec. 50 ~ 70g (with jig tape)
	Measurement of threading back tension	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	• Measure according to sec. 5-1 Spec. 15 ~ 25g (x 5cm)
	Measurement of supply side main brake torque	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	• Measure according to sec. 4-4-2 Spec. 100 ~ 130g (x 5cm)
	Measurement of take-up side main brake torque	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	• Measure according to sec. 4-4-3 Spec. 100 ~ 130g (x 5cm)
	Recording functional check	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	



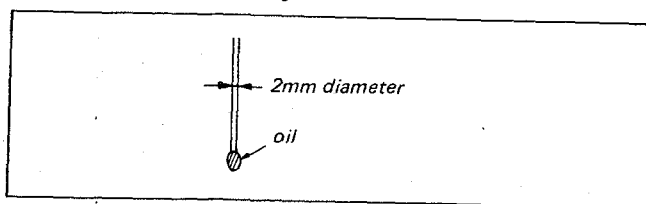
2-3. OTHERS

(1) SONY oil

- Be sure to use the SONY oil as the lubrication oil. (If oil other than the SONY oil is used, various troubles due to a different viscosity tends to be caused.)

SONY oil : Part No. 7-661-018-01
(Mitsubishi diamond oil #440)

- Use the SONY oil in which dust or other foreign material have not mixed for lubricating the bearing. (If foreign material is in the oil, wear or burning of the bearing tends to be caused.)
- A drop of the lubrication oil in the following description is equal to an oil drop on a pick with 2 mm diameter as shown in the figure.



(2) Regarding overhaul of equipment

When overhaul of an equipment is attempted, replace parts referring list. For the parts not listed in upper list, such as motors and heads, refer the following items.

Audio/CTL Head	; approx. 3000 hours
Erase Head	; approx. 4000 hours
Threading dc motor	; depending on threading times (approx. 3000 hours)
AC motor	; approx. 4000 hours

SECTION 3

REPLACEMENT OF MAJOR PARTS

3-1. REPLACEMENT OF UPPER DRUM ASS'Y (including eccentricity adj.)

- The Video Heads cannot be replaced as a single head component. Replace the Upper Drum Ass'y as a whole when any one of these heads is required to be replaced.
 - Never touch the hex. nut in the center of the Head Drum Assembly.
1. Unsolder the four leads of the Video Head from the VH board and remove the Upper Drum Ass'y from the Head Drum Assembly.
 2. Clean the flange and bottom surfaces of the replacement Upper Drum Assembly with chamois moistened with methanole or other cleaning fluid.
 3. Place the Upper Drum Assembly so that the white lead head is close to the small drill mark (near the VH board) on the flange surface. Position the Upper Drum Ass'y over the mounting holes. Thread the two screws snugly but do not tighten.

(If the white lead is not brought to the small drill mark hole, the polarity of the head is reversed in the playback and the playback picture cannot be obtained.)
 4. Assemble the drum eccentricity adj. jigs (1), (2), (3) and (4) (Jig Ref, Nos. J-1, -2, -3, -4) as shown in Fig. 3-1. Mount the assembled jigs on the slant base so that the tip probe positions at the point about 5mm apart from the top edge of the upper drum.
 5. Turn the AC motor slowly clockwise (↻) (the same direction with its rotation) and confirm that the pointer deflection of the gauge is within 8μ during one complete turn of the upper drum. If the specification is satisfied, processed with Step 7 and the followings. If it is not, perform Step 6.
 6. Tap the inside of the upper drum with a nylon hammer or a screwdriver handle and like so that the gauge deflection remains within 8μ .
 7. After the adjustment, tighten the two screws that are securing the upper drum, alternately and gradually (Tightening torque; more than 10kg.cm)
 8. After the screws are tightened, check again that the eccentricity of the upper drum is within 8μ meters.
 9. Solder the leads from the video heads to the VH board.
 10. Insert, thread and run the cleaning cassette type KCS-1C in normal FWD mode for 10 to 20 seconds (in first use). (Purpose is to smooth out the surface of the video heads.)

Note: When a cleaning cassette is used repeatedly, it requires slightly longer FWD time. However, 4 or 5 times of use is the maximum life of a cleaning cassette.

Abrasive power of the KCS-1C is approx. 1 micron per every ten seconds.

11. When this replacement is attempted, perform checks for the various values given in the following sections.

- 6-10-2. Video head dihedral adj.
- 6-8-1. Tape path adj.
- 6-5. F-Forward and Rew modes tape run adj.
- 6-6. Forward mode tape run adj.
- 6-8-2. Audio head height adj.
- 6-8-3. Audio head phase adj.
- 6-8-4. Audio/CTL head position adj.
- Switching position adj.
- Y-Record current freq. response adj.
- Y-Record current level adj.
- Chroma record current adj.

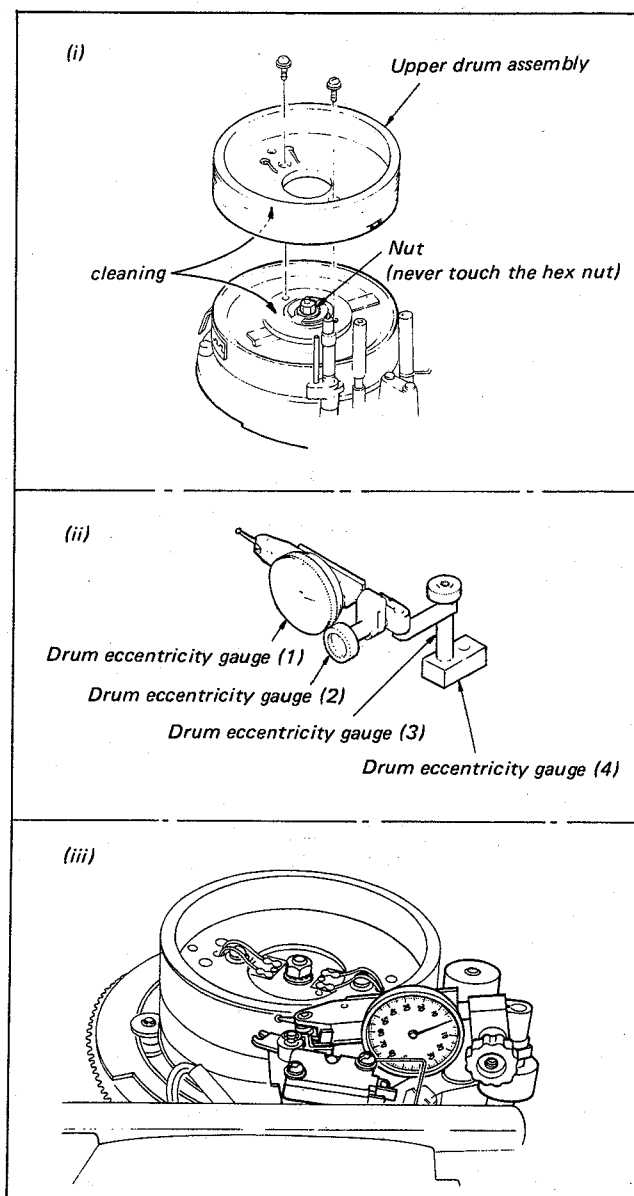


Fig. 3-1. Replacement of upper drum

3-2. REPLACEMENT OF DRUM UNIT

- When replacing the Drum unit, do not remove the slant base, but leave the slant base on the main chassis. Remove the defective drum unit from the slant base. Therefore height of the tape guides and stationary heads remain unchanged even after the drum unit replacement so that the adjustment after drum replacement, becomes easy.
1. Disconnect the connectors CN-3 on PR-2 board (from video heads) and CN61, CN62 on MA-5 board (from P.G. and drum motor drive). Remove the three screws shown in Fig. 3-2, and remove the defective drum.
 2. Place the replacement drum unit on the slant base. Install the drum into the slant base while turn the drum unit in clockwise direction. (Turning the drum clockwise increases the head-to-tape contact at the drum's input and also overlap amount.)
 3. Re-connect the connectors.
 4. When this replacement is attempted, perform checks for the various values given in the following sections.
 - Drum free speed adj.
 - 6-8-1. Tape path adj.
 - 6-5. F-Forward and Rew mode tape run adj.
 - 6-6. Forward mode tape run adj.
 - 6-8-2. Audio head height adj.
 - 6-8-3. Audio head phase adj.
 - 6-8-4. Audio/CTL head position adj.
 - 6-11. Erase head height adj.
 - Switching position adj.
 - PB RF system alignment
 - Y-record current freq. response adj.
 - Y-record current level adj.
 - Chroma record current adj.
 - Color killer adj.

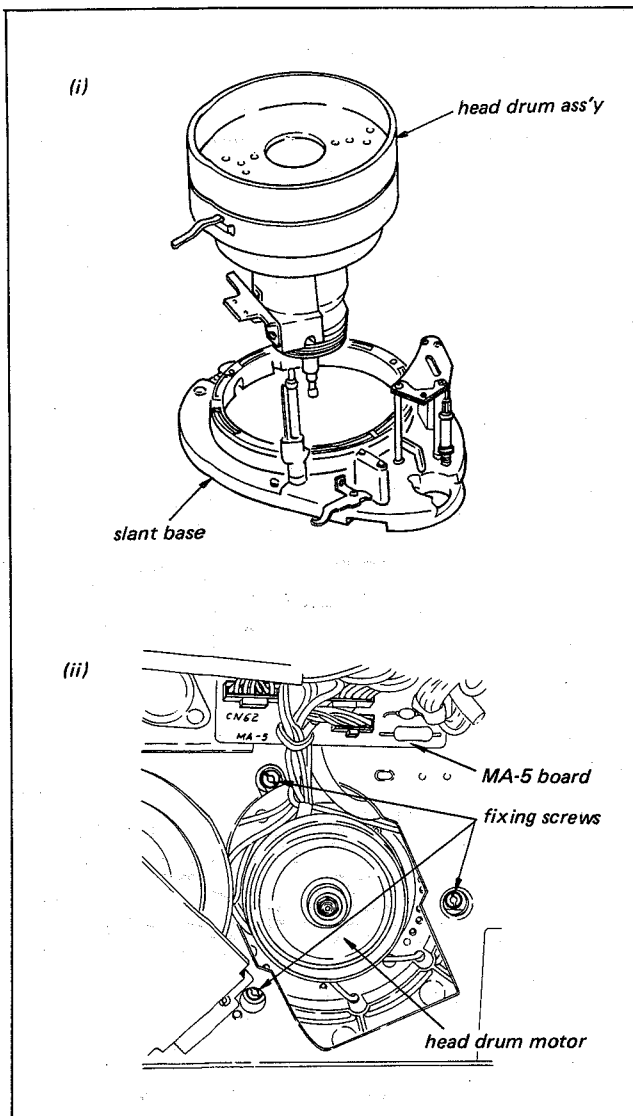


Fig. 3-2. Replacement of head drum ass'y

3-3. REPLACEMENT OF AC MOTOR

- This motor contains a thermal fuse which cuts the internal circuit of the motor when the temperature rises abnormally. It restores the circuit when the temperature decreases to normal.
1. Remove the motor pulley on the rear of the machine. (Hold the motor fan and then unthread the pulley in counter-clockwise direction.)
 2. Disconnect the connector of the AC motor. Loosen the screw holding the hum proof belt. Remove the four fixing screws and remove the motor.
 3. Remove the motor pulley stopper from the defective motor and install it to the new motor as shown in Fig. 3-3.
 4. Install the washer for ground between the AC motor and the bracket. Tighten the four fixing screws and the hum proof belt onto the machine.

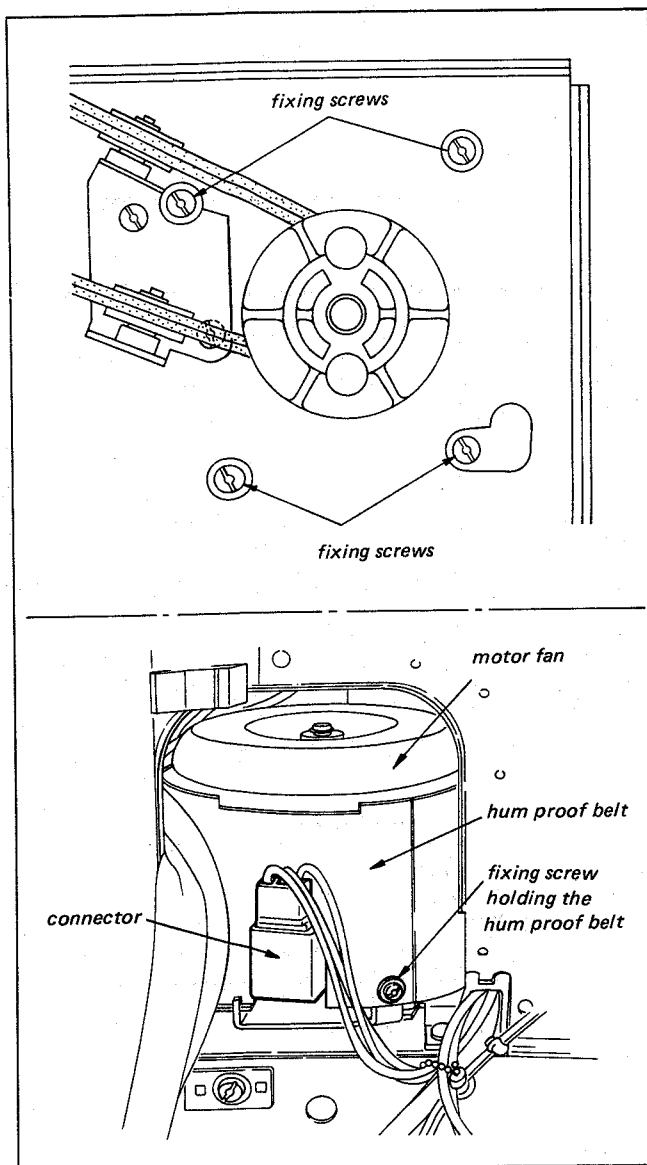


Fig. 3-3. Replacement of AC motor

3-4. REPLACEMENT OF THREADING DC MOTOR

1. Remove the Threading Motor Ass'y from the Gear Box Ass'y as shown in Fig. 3-4.
2. Unsolder the leads of the Threading Motor from the printed circuit board and remove the printed circuit board. Replace the Threading Motor. Install the printed circuit board to the threading motor bracket by tightening screws. Solder the leads of the DC motor to the printed circuit board. (If soldering is performed first and tightening is then attempted, sometimes DC motor cannot be mounted to the bracket.)
3. Install the DC motor assembly temporarily to the gear box ass'y.
4. Adjust position of the threading motor assembly so that the motor coupling shown in Fig. 3-4 can go smoothly into the gear box rotating spindle. Tighten then screws.
5. Insert the gear box coupling into the gear box assembly rotating spindle in the direction as shown in Fig. 3-4. Push then the motor coupling towards the gear box coupling. Adjust then the clearance between both couplings as shown in Fig. 3-4, and tighten finally the set-screw.

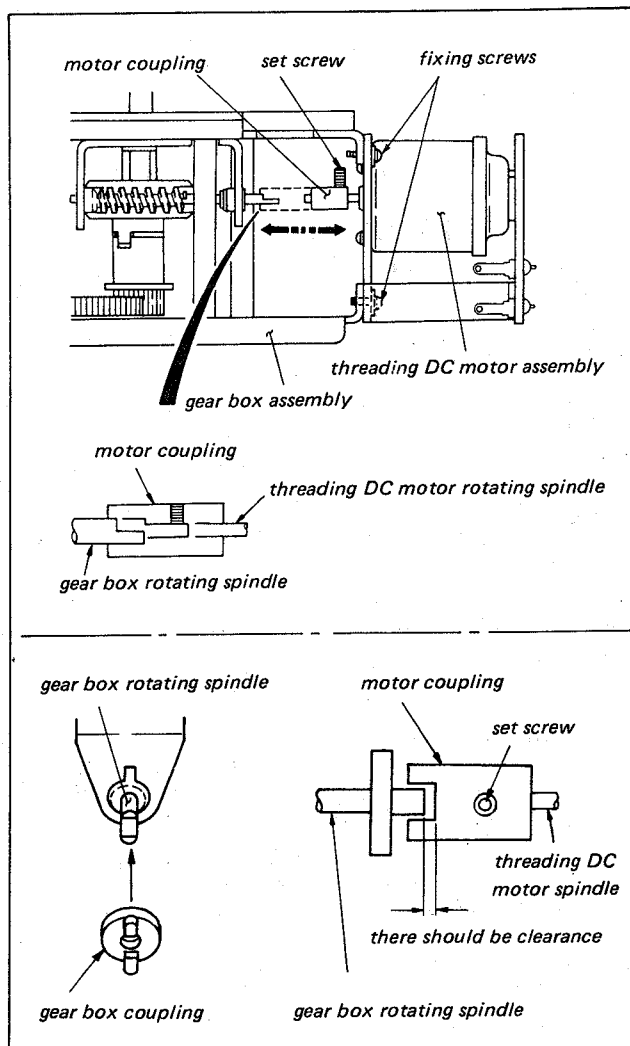


Fig. 3-4. Replacement of threading DC motor

3-5. REPLACEMENT OF AUDIO/CTL HEAD

1. Remove the three screws from the studs, and remove the Audio/CTL Head Ass'y as shown in Fig. 3-5.

Note: DO NOT TOUCH ANY SCREW OTHER THAN THESE THREE SCREWS. If any screw other than these three screws is manipulated, head's slantness azimuth, etc will become mis-aligned that makes subsequent adjustment difficult.

2. Loosen the screws on the head assembly as shown in Fig. 3-5 and remove the Audio/CTL Head from the head assembly.
3. Take notes of the colors of lead wires, and write them down on the paper before unsoldering/removing the lead wires. Remove then lead wires.
4. After head replacement in completed, perform the following checks for the correct values given in the following sections.

sec. 6-8-2. Audio Head Height Adj.
 sec. 6-8-3. Audio Head Phase Adj.
 sec. 6-8-4. Audio/CTL Head Position Adj.
 sec. 6-6. FWD Mode Tape Run Adj.
 Audio Alignment

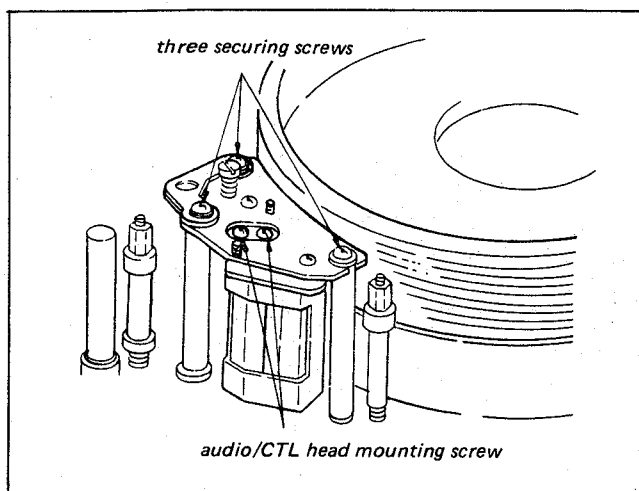


Fig. 3-5. Replacement of Audio/CTL head

3-6. REPLACEMENT OF FULL ERASE HEAD

1. Remove the securing screw (L) from the erase head base and remove the erase head ass'y as shown in Fig. 3-6.

Note: Do not touch any screw other than the securing screw (L). The three screws especially, set-screws (A), (B), (C) (height, slant, azimuth adj.) should not manipulated.

2. Take notes of the colours of lead wires, and write them down on the paper before unsoldering/removing the lead wires. Remove then lead wires.

3. Replace the erase head and press the erase head in the direction shown by the arrow in Fig. 3-6. And tighten the two fixing screws.
4. Install the erase head ass'y to the erase head base and solder the leads.
5. Perform Sec. 6-11 Erase Head Height Adj.

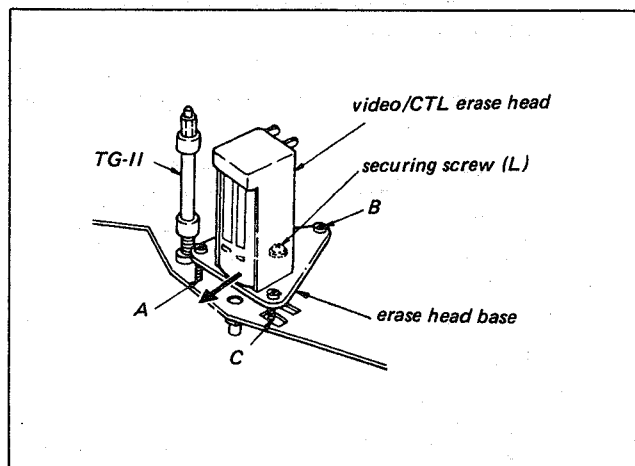


Fig. 3-6. Replacement of full erase head

3-7. REPLACEMENT OF ERASE HEAD BASE ASS'Y

- It is rare case to replace the erase head base ass'y. But when replacing the erase head base ass'y, replace the standardized replacement erase head base ass'y for service work only.

- Tape guide of the erase head ass'y that are actually used in equipment is the rotating tape guide while other side is the fixed tape guide.

- But two tape guides of the standardized replacement erase head base ass'y are rotating tape guides.

- Install the standardized replacement erase head base ass'y. Install the full erase head and the tape slack sensor arm ass'y that are actually used in equipment.

- And when replacing the tape guide, please order the parts individually shown in the Exploded Views.

- After erase head base ass'y replacement is completed, perform the following checks and adjustments.

- 4-5-1. Supply Tension Regulator Position Adj. (FWD mode)
- 4-5-4. Supply Tension Regulator Stopper Position Adj.
- 6-8-1. Tape Path Adj.
- 6-9-1. Pinch AUX. plate Adj.
- 6-9-2. FWD Slack Switch Position Adj.
- 5-2. Forward Mode, Tape Hold-Back Tension Adj.
- 5-4. Fast-Forward Mode, Tape Hold-Back Tension Adj.
- 6-5. Fast-Forward Mode and Rewind Modes Tape Run Adj.
- 6-11. Erase Head Height Adj.

SECTION 4

LINK AND DRIVE SYSTEM ALIGNMENT

4-1. REEL TABLE ADJUSTMENT

Since the reel table height from the chassis functions as the reference height in the entire tape thread and run system, it is requested that the reel table height adjustment should be attempted carefully, and deliberately.

4-1-1. Take-up Reel Table, Height Adj.

1. Put the machine into the EJECT mode.
2. Install the Position Jig (Jig Ref. No. J-13) on the machine where a cassette is installed.
3. Install the Reel-Table Height Adjustment Jig (Jig Ref. No. J-14) as shown in Fig. 4-1, in the shaded portion of the Position Jig.

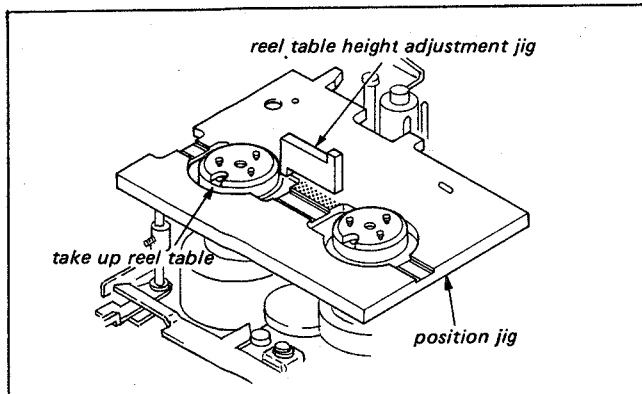


Fig. 4-1. Take-up reel-table height adjustment (EJECT mode)

4. Inspect the Reel Table Height Adj. Jig so that it has two probes as shown in Fig. 4-2 (iii). One probe is longer while the other probe is shorter.

If the reel table has correct height, the shorter probe of the jig can slide over reel table, leaving a space between jig and reel table as shown in Fig. 4-2 (i), while the longer probe of the jig is blocked, and cannot slide over reel table as shown in Fig. 4-2 (ii).

If the reel table height is incorrect, adjust the height, by adding or removing washer under the reel table.

- Selective washer identification for adj.

Washer 6 mm diameter, 0.5 mm thick	3-701-444-21
Washer 6 mm diameter, 0.25 mm thick	3-701-444-11
Washer 6 mm diameter, 0.13 mm thick	3-701-444-01

- Apply a drop of SONY oil on the reel spindle as shown in Fig. 4-3, whenever the reel table is removed and is adjusted its height with washer. Amount of oil should be one drop that is scooped by tip of 2 mm diameter twig such as pencil lead.

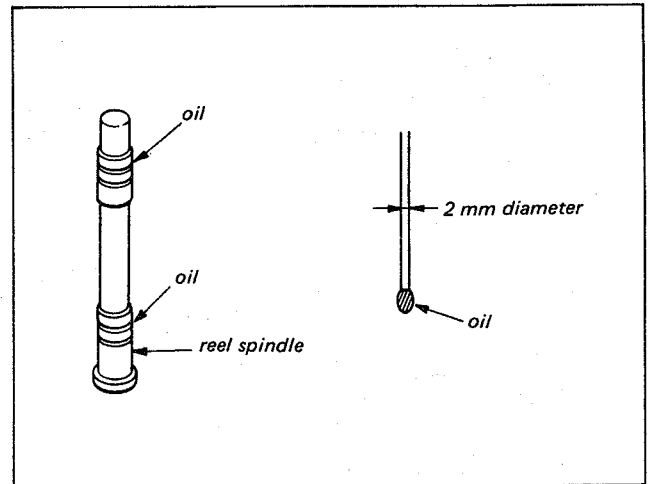


Fig. 4-3. Lubrication of reel spindle

5. Tighten a screw on top of the reel table (reel table securing screw).
6. As Fig. 4-4 (i), inspect the vertical play of the Take-up Reel Table with use of a slide vernier calliper. Push up and down the reel table for inspection that the play should be 0.15 mm ~ 0.25 mm. If not, remove or add a selective washer, on top of the reel table as shown in Fig. 4-4 (ii). Use same washers shown in step 4.

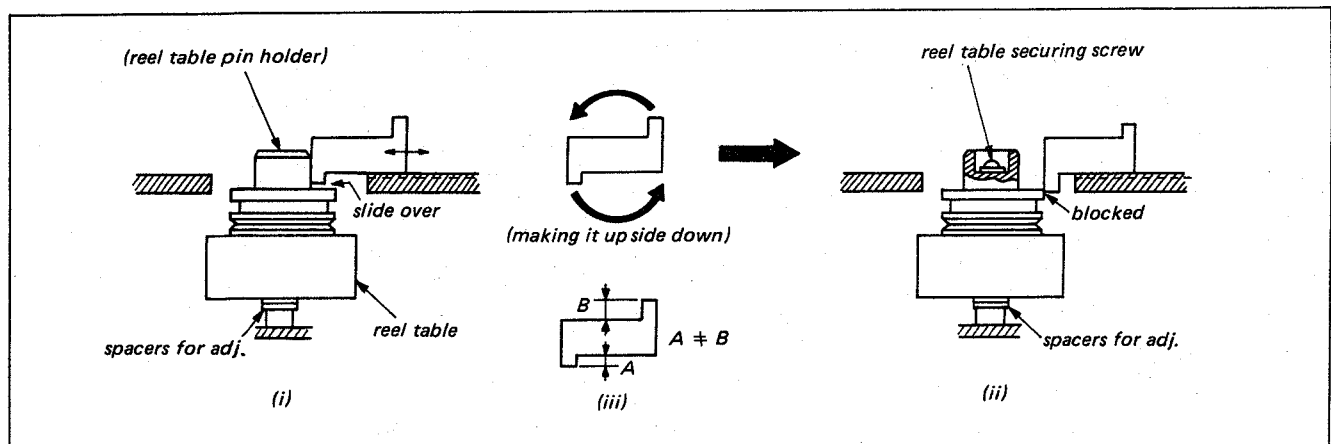


Fig. 4-2. Reel table height adjustment (EJECT mode)

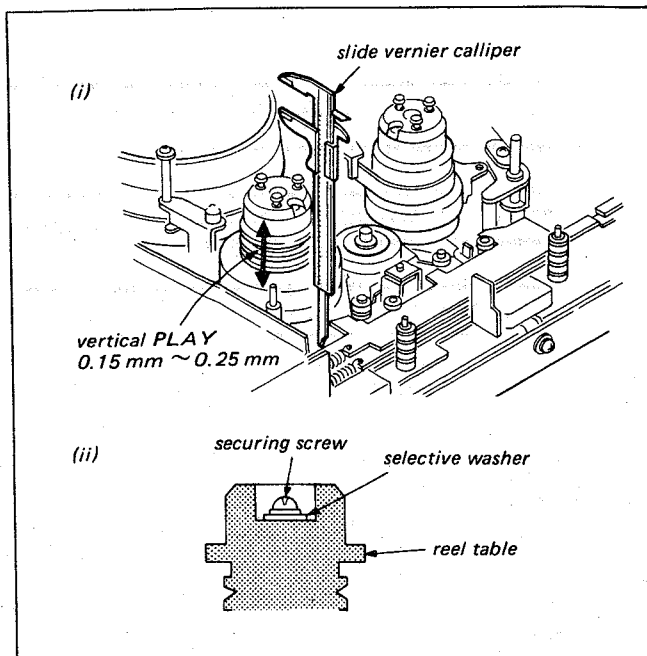


Fig. 4-4. Reel table vertical play adjustment (EJECT mode)

4-1-2. Supply Reel Table, Height Adj.

1. Put the machine into the EJECT mode.
2. Install the Position Jig (Jig Ref. No. J-13) on the machine where a cassette is installed.
3. Install the Reel-Table Height Adj. Jig (Jig Ref. No. J-14), as shown in Fig. 4-5, in the shaded portion of the Position Jig.
4. Proceed to the Supply Reel-Table Height inspection and adjustment, following the sec. 4-1-1 step 4.
 - After adjustment, perform the Supply Tension Regulator Position Adj. (FWD mode) Sec. 4-5-1 since the supply reel table brake band is once removed in the course of the Supply Reel Table Height Adj.
5. Proceed to the Supply Reel-Table vertical play inspection following the sec. 4-1-1 step 6.

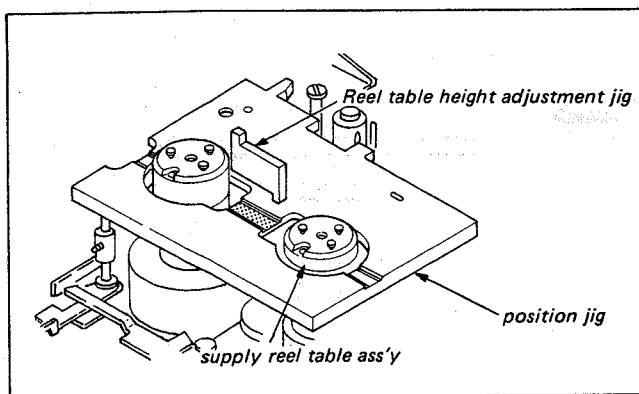


Fig. 4-5. Supply reel table height adj. (EJECT mode)

4-2. SOLENOID SYSTEM ADJUSTMENT

4-2-1. Main Solenoid Adj.

- If the Main Solenoid position happens to be incorrect in such a condition that the solenoid's iron core travelling stroke is short (i.e. the clearance between the white plastic piece and the square opening of the Function Block, as shown in Fig. 4-6.), possible trouble is that the machine's mechanism links are not moved to the required position in respective modes of FWD, FF, REW and EJECT, and that the normal tape run cannot be expected.
- If, in opposite, the solenoid's iron core travelling stroke is too long, solenoid's pulling power becomes weak so that the possible trouble is that the mechanism link is unlocked (released).

1. Without threading cassette, put the machine into the FF mode.
2. While the machine is put into the FF mode, locate the main solenoid, observe the clearance between the square opening of the function block and the plastic white block, as shown in Fig. 4-6.

The clearance should be 0.1 mm ~ 0.5 mm. If not, adjust the position of the main solenoid with a 4 mm diameter eccentric screwdriver (Jig Ref. No. J-5).

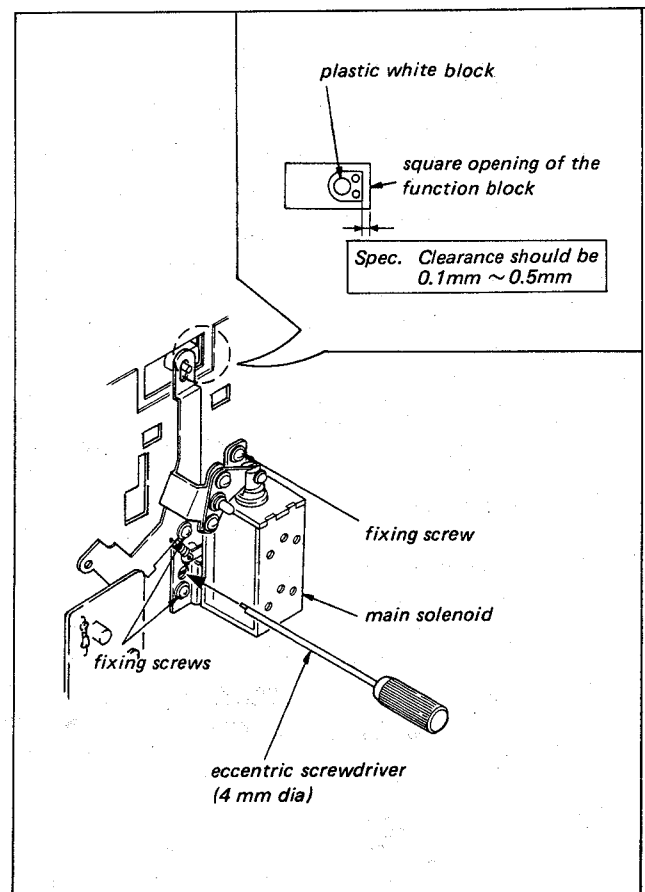


Fig. 4-6. Main solenoid adjustment (FF mode without tape)

4-2-2. Idler Solenoid Adj.

- If the Idler Solenoid happens to be incorrect as shown in Fig. 4-7 that the clearance is insufficient, the possible trouble is that the take-up reel-table rotation becomes unstable, because the torque, which is generated by motor and is transmitted by a rubber belt, cannot be duly transmitted to the Take-up Reel Table.
 - If, in opposite, the clearance A is too much, the Idler Solenoid pulling power becomes weak in the modes of the FWD, Unthreading and EJECT. If the machine is used for long hours continuously, the Idler Solenoid temperature increases to weaken the solenoid pulling power.
1. Turn the POWER ON. Without threading cassette, set the machine into the FWD mode.
 2. While the machine is in FWD mode, check to see that the clearance A shown in Fig. 4-7 is 0.3 mm ~ 0.7 mm. If not, adjust the solenoid arm position with 4 mm diameter eccentric screwdriver (Jig Ref. No. J-5).

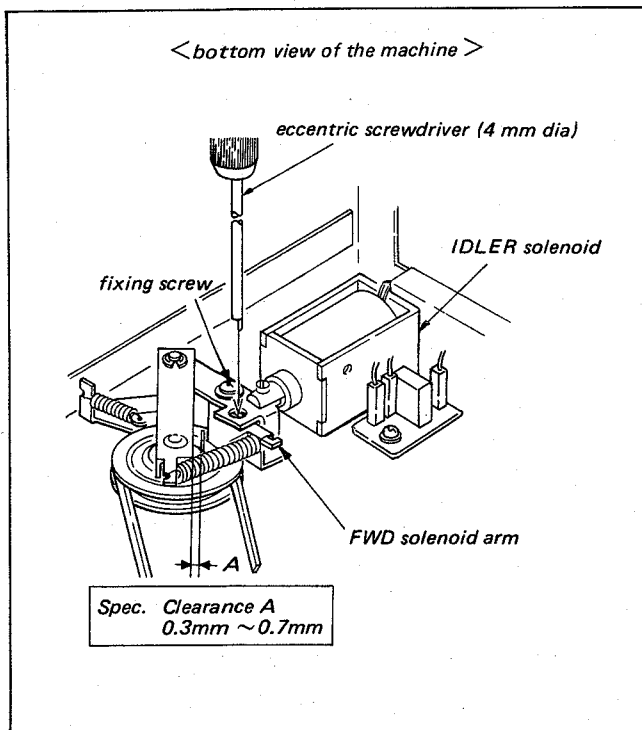


Fig. 4-7. Idler solenoid adjustment (FWD mode without cassette)

4-2-3. Function Solenoid Position Adj.

If the Function Solenoid position becomes incorrect, the trouble is that the machine cannot be put into the desired mode even though the Function button is pressed, and that the machine remains in the FR STOP mode.

1. Press the function button of the replaced Function Solenoid to energize the Function Solenoid.
2. Check to see that the clearance between the chassis and the selector is 1.6 mm ~ 2.4 mm. If not adjust the position of the Function Solenoid as shown in Fig. 4-8.

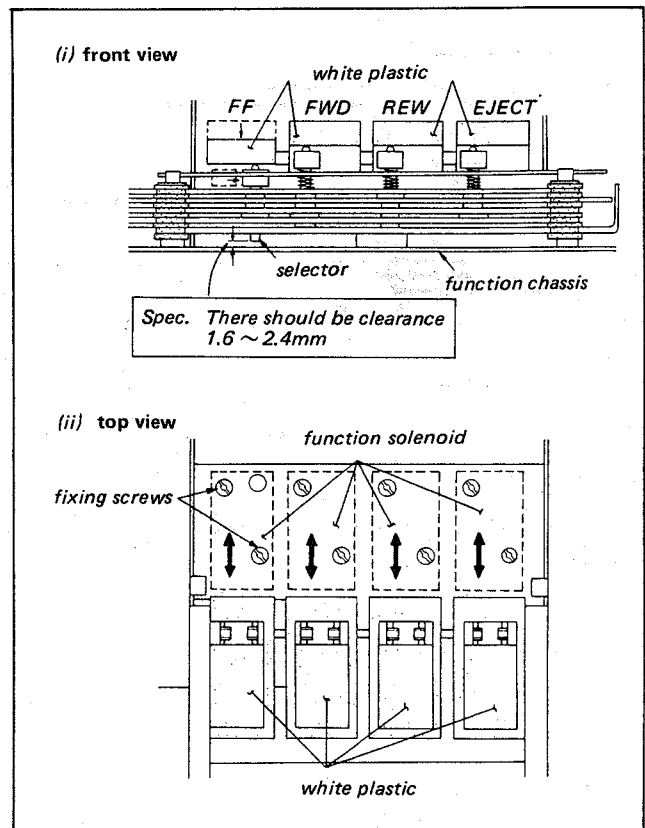


Fig. 4-8. Function solenoid position adj. (power : ON mode)

4-3. THREADING ARM ADJUSTMENT

There are three adjustments to be performed in the section 4-3 Threading Arm Adjustment, i.e. 4-3-1 Margin Gear position adj. 4-3-2 Threading Arm Stopper position adj. and 4-3-3 FR Unthread End switch position adj. These three adjustments are closely related. If any one of these three adjustments is attempted, perform the rest of two adjustments at the same time.

4-3-1. Margin Gear Position Adj.

If a machine is left with this adjustment unfinished, the possible trouble is that the Threading Arm will not come out because the Threading Arm is obstructed by the Pinch Roller.

1. Put the machine into the EJECT mode.
2. Check to see that the Main Ring moves by 0.1 mm ~ 3 mm when the Main Ring is pushed with finger in the direction shown by the arrow in Fig. 4-9.

If not, loosen the two screws with allen wrench shown in Fig. 4-9 and rotate the Margin Gear for the correct margin of 0.1 mm ~ 3 mm.

Approx. estimate of 3 mm margin ; If the Threading Roller is moved until it reaches the Threading Arm, as it is pushed by finger, its travelling distance is approx. correct 3 mm margin.

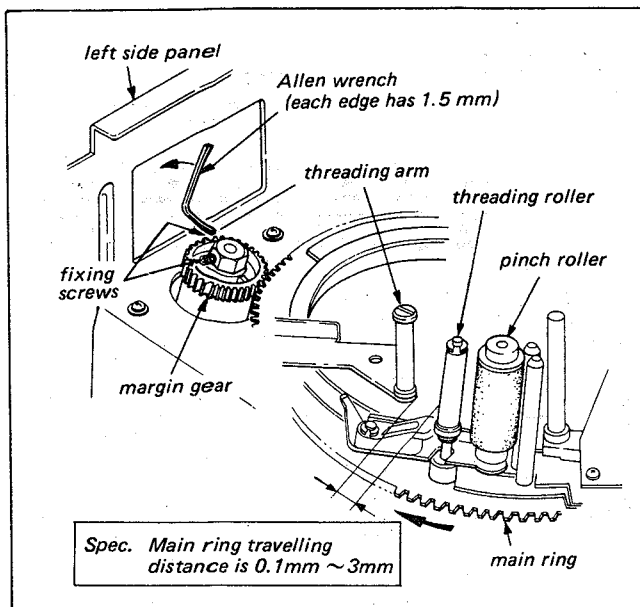


Fig. 4-9. Margin gear position adj. (EJECT mode)

- Method to adjust and fix the hex nut on top of the Margin Gear.
 - (i) Turn the Allen wrench of 1.5 mm edge length $\curvearrowright$ 30 degrees as shown in Fig. 4-10 (i).
 - (ii) While the Allen wrench is left inserted in the hex nut, rotate the hex nut together with the Allen wrench approx. 80 degrees as shown in Fig. 4-10 (ii).
 - (iii) Tighten the Allen wrench screws.

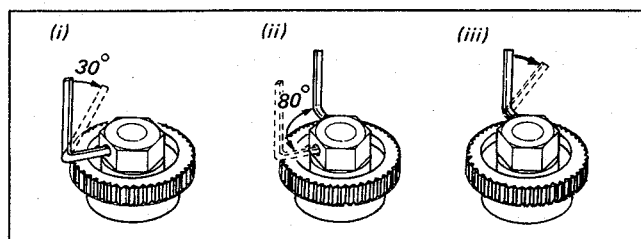


Fig. 4-10. Margin gear installation (EJECT mode)

When this adjustment is attempted, perform the checks of the various values given in the following section.

- 4-3-2. Threading arm stopper position adj.
- 4-3-3. FR unthread-end switch position adj.

4-3-2. Threading Arm Stopper Position Adj.

If a machine is left with this adjustment unfinished, the possible trouble is that the machine starts threading without tape in the cassette-in moment.

1. Without threading tape, put the machine into the FR-STOP mode.
2. Install the Position Jig (Jig Ref. No. J-13) on the machine as shown in Fig. 4-11.

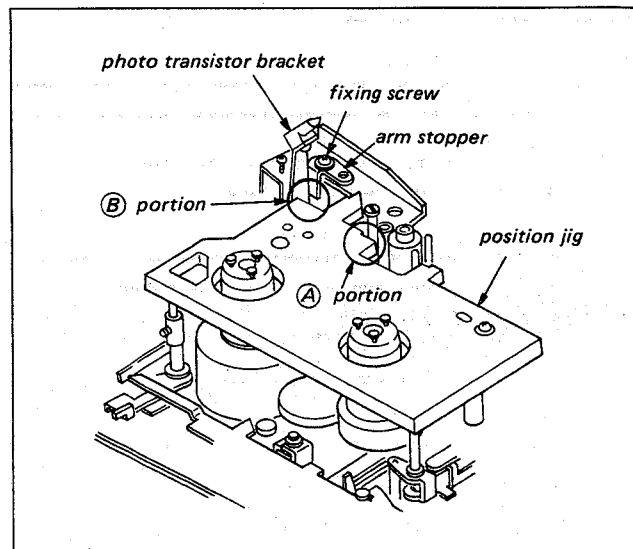


Fig. 4-11. Threading arm stopper adjustment (EJECT mode)

3. Put the machine into the EJECT mode.
4. Check to see that two requirements are simultaneously met at (A) and (B) portions in Fig. 4-11.

Requirement-1 ; When (A) is in contact, Fig. 4-12, (B) should be in contact or the clearance should be less than 0.1 mm.

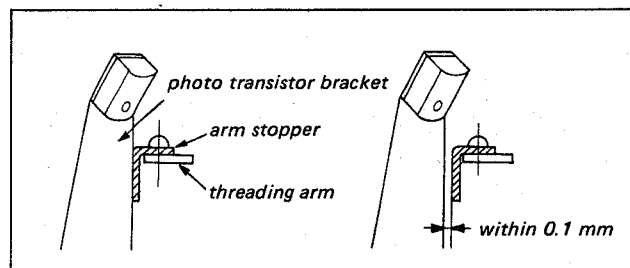


Fig. 4-12. When (A) portion is in contact

Requirement-2 ; When (B) is in contact, Fig. 4-13, (A) should be in contact, or the clearance should be less than 0.4 mm.

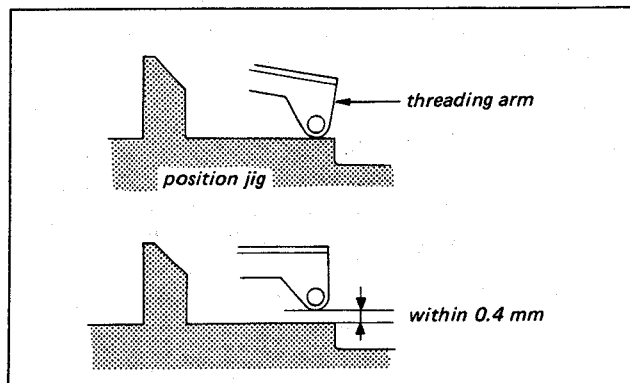


Fig. 4-13. When (B) portion is in contact

If the above two requirements cannot be met, proceed to the step 5.

5. Loosen the fixing screw of the Arm Stopper referring Fig. 4-11. Adjust the Threading Arm Stopper to meet the two requirements in step 4.

- ⌚ Clockwise rotation of the Arm Stopper makes the (A) in contact.
- ⌚ Counter-clockwise rotation of the Arm Stopper makes the (B) in contact.

When this adjustment is attempted, perform the checks of the various values given in the following section.

4-3-1. Margin gear position adj.

4-3-3. FR unthread-end switch position adj.

4-3-3. FR Unthread-End Switch Position Adj.

- If this adjustment is improper such that the FR Unthread-End switch turns on earlier than expected in the Ejecting from the FR-STOP mode, (i.e. the switch turns on in a larger than 2.7 mm, for example 3 mm in Fig. 4-14), the possible trouble is that the Threading Arm will not return to its home position when the Eject is completed.
 - If the FR Unthread-End switch will not turn on easily, the mechanism cannot go to the next operation even though the Arm returns because the Arm return is not detected electrically.
1. Without threading tape, put the machine into the FR-STOP mode.
 2. Install the Position Jig (Jig Ref. No. J-13) as shown in Fig. 4-14.
 3. Put the machine into the Eject mode.
 4. Grasp the hex nut on top of the Margin Gear with a pliers as shown in Fig. 4-14 and turn the hex nut (⌚) counter-clockwise until the FR Unthread-End switch is turned OFF to make a click sound.
 5. While grasping the hex nut with a pliers, turn the hex nut slowly (⌚) clockwise this time until the FR Unthread-End switch is turned ON to make a click sound.
 6. Check to see that the clearance between the Position Jig and the Threading Arm is 0.7 mm ~ 2.7 mm when the click sound is made in step 5. If clearance is out of spec., proceed to step 7.
 7. Loosen the two fixing screws securing the FR Unthread-End switch, shown in Fig. 4-14. Adjust the switch position.
 - Pressing the switch in the arrow direction in Fig. 4-14 makes the clearance wider.
 - Bringing the switch in the direction opposite to the arrow in Fig. 4-14 makes the clearance narrower.
 - Adjusting procedure; Bring the Threading Arm to the Position Jig with 1.5 mm clearance, and adjust the switch position so that it is just turn ON at this instance. Tighten the two fixing screws.

When this adjustment is attempted, perform the checks of the various values given in the following section.

4-3-1. Margin gear position adj.

4-3-2. FR unthread end switch position adj.

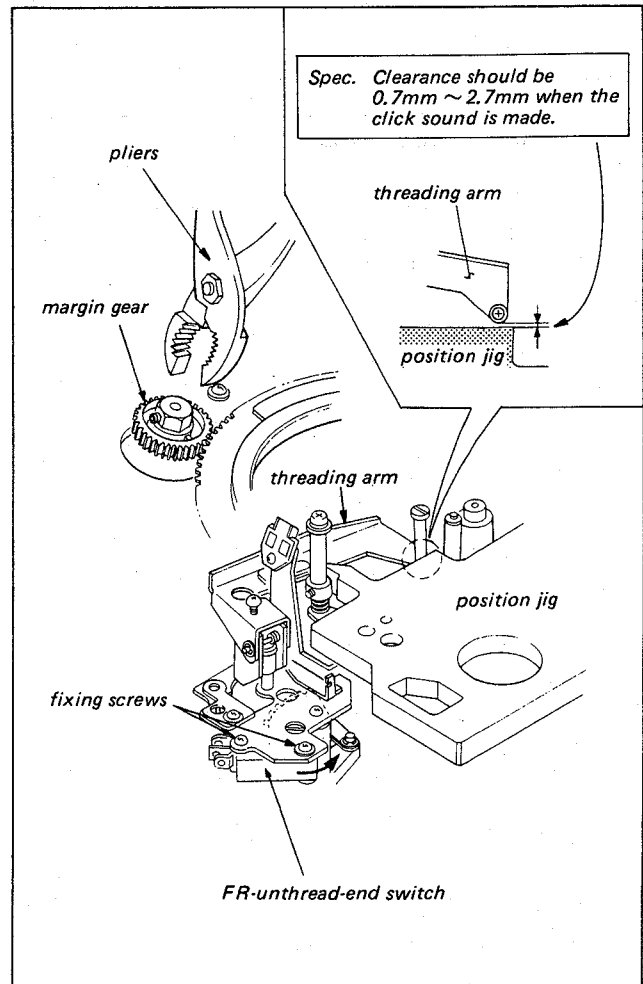


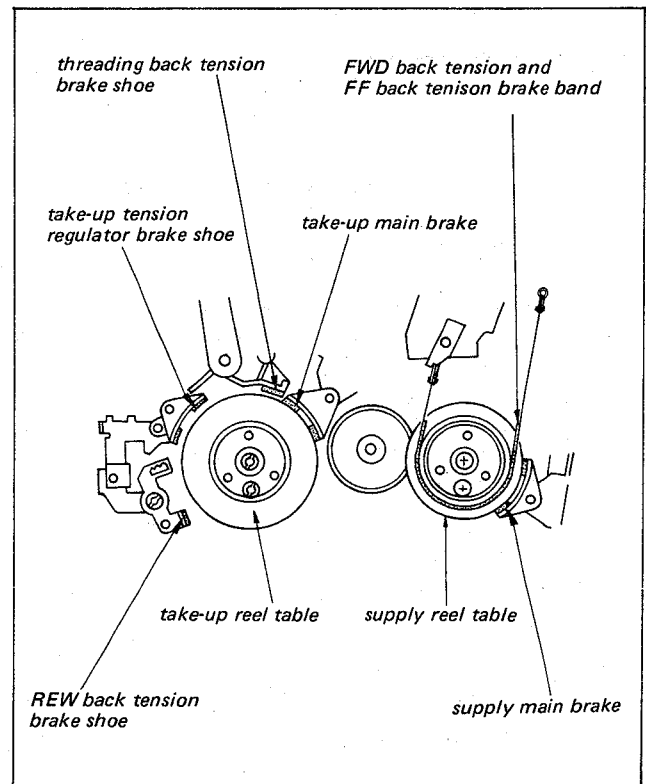
Fig. 4-14. FR Unthread-End switch position adj. (EJECT mode)

4-4. BRAKE SYSTEM ADJUSTMENT

- This machine has the supply reel table main brake and the take-up reel table main brake. Other various brake shoes for various back tension contacts the supply or take-up reel table depending on each operating mode as follows.

Mode	Reel table	Take-up reel table	Supply reel table
Cassette-up (EJECT completed)		Only "threading back tension" brake shoe is ON.	Only "supply main brake" is ON.
Cassette-in → FR-STOP		Only "threading back tension" brake shoe is ON. (Take-up reel supplies the tape.)	Only "supply main brake" is ON.
FR-STOP mode		Only "take-up main brake" is ON.	Only "supply main brake" is ON.
During Threading		Only "threading back tension" brake shoe is ON. (Take-up reel supplies the tape.)	"Supply main brake" and "FWD back tension" brake band are ON.
During PLAY		Only "take-up tension regulator brake shoe" is ON. (Takes up tape onto take-up side.)	Only "FWD back tension" brake band is ON.
During PAUSE (i) Still possible tape (KCA type or KCS type cassette)		Only "threading back tension" brake shoe is ON. (T-reel table is stopped is several 100msec later, after PAUSE button is pressed.)	"Main brake" and "FWD back tension" brake band are ON.
(ii) Still impossible tape (KC type cassette)		Only "threading back tension" brake shoe is ON. (T-reel table is stopped immediately after PAUSE is pressed.)	"Main brake" and "FWD back tension" brake band are ON.
(iii) During still-adj. operation		Only "threading back tension" brake shoe is ON. (Takes up tape onto the take-up side during still-adj. knob is pushed.)	Only "FWD back tension" brake shoe is ON, during still-adj. knob is pushed.
During (Un-threading (threading completed → FR-STOP)		Only "take-up tension regulator brake shoe" is ON. (Takes up tape onto the take-up side.)	Only "supply main brake" is ON.
During FF		Free (Takes up tape onto the take-up side.)	Only "FF mode back tension" brake band is ON. (Same as FWD back tension brake band.)

During REW	Only "REW back tension" brake shoe is ON.	Free (Takes up tape onto the supply side.)
FR-STOP → EJECT (Just before Ejects is completed.)	Only "take-up tension regulator" brake shoe is ON. (Takes up tape onto the take-up side.)	Only "supply main brake" is ON.



4-4-1. S.Hold Lever Position Adj.

If the machine is left with this adjustment unfinished, the possible troubles are;

- The Take-up side main brake will not release from the Take-up Reel Table, during the period from FR-STOP to the EJECT.
 - The AC motor switch will not turn ON in the respective modes indicated in the above paragraph (i).
- Without threading cassette, put the machine into the FWD mode.
 - Check to see that the clearance A is 0 ~ 0.2 mm as shown in Fig. 4-15.

If the required clearance cannot be observed, loosen the screw shown in Fig. 4-15 and adjust the S.hold lever in the directions shown by the arrow in Fig. 4-15 while pushing the S.hold arm towards the main ring.

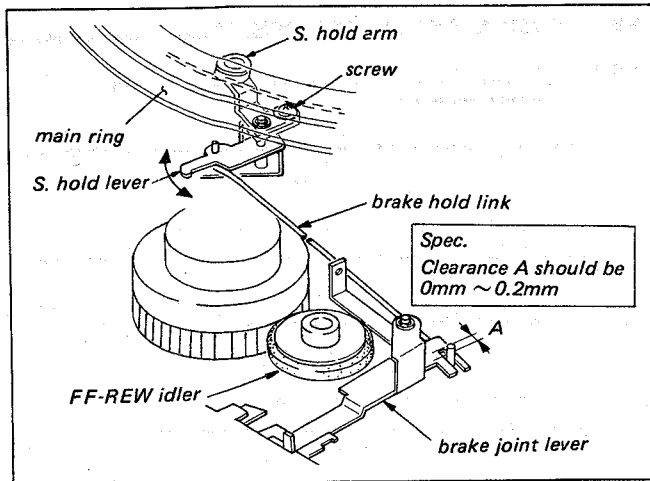


Fig. 4-15. S. Hold lever position adj.
(FWD mode without tape)

4-4-2. Supply Reel Table, Brake Torque Adj.

If the Supply side brake torque is low, possibility of the tape damage trouble increases in the unthreading mode, because tape is fed from the Supply Reel Table so that the scars on tape can be given by the Threading Arm's Top Flange.

1. Without threading tape, put the machine into the EJECT mode.
2. Grasp the top of the Supply Reel-Table with fingers. Check to see the clearance of 0.3 mm ~ 0.5 mm shown in Fig. 4-16 as it is turned (↻) clockwise approx. 30 degrees. Correct clearance is 0.3 mm ~ 0.5 mm. If not, adjust it by bending the Supply Brake Lever shown in Fig. 4-16.

If there is no clearance, the brake shoe will not be engaged with the reel table.

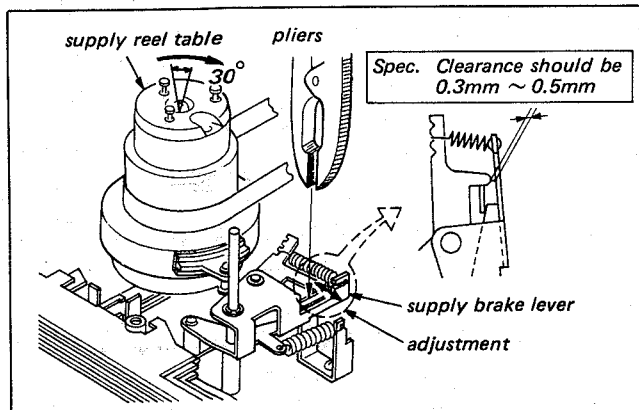


Fig. 4-16. Supply reel-table, brake torque adj. (EJECT mode)

3. Install a 100 mm diameter dummy reel pack tape (Jig Ref. No. J-7) on the Supply Reel-Table as shown in Fig. 4-17.
4. Hook a tension scale (200 g full scale) (Jig Ref. No. J-17) on an end of the dummy reel pack tape. Pull out the tape at the constant speed of approx. 9.5 cm/sec in the direction shown in Fig. 4-17. Scale reading should be 100 g ~ 130 g (x 5 cm).
5. Select a proper spring hook that provides tension scale reading of 100 g ~ 130 g (x 5 cm).

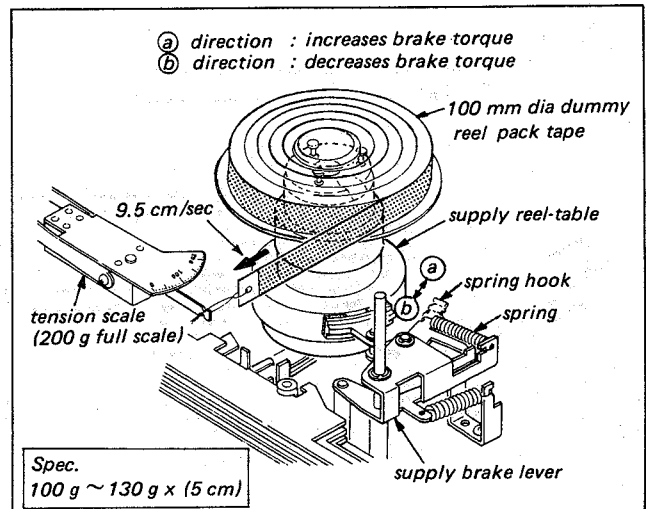


Fig. 4-17. Supply reel-table brake torque adj. (EJECT mode)

4-4-3. Take-up Reel Table, Brake Torque Adj.

1. Without threading tape, put the machine into the FR-STOP mode.
 2. Grasp the top of the Take-up Reel-Table with fingers. Check to see the clearance of 0.3 mm ~ 0.5 mm shown in Fig. 4-18 as it is turned (↻) clockwise approx. 30 degrees. If not, adjust it by bending the Take-up Brake Lever, shown in Fig. 4-18.
- If there is no clearance, the brake shoe will not be engaged with the reel table.
3. Install a 100 mm diameter dummy reel pack tape (Jig Ref. No. J-17) on the Take-up Reel-Table as shown in Fig. 4-19.
 4. Hook a tension scale (200 g full scale) (Jig Ref. No. J-17) on an end of the dummy reel pack tape. Pull out the tape at the constant speed of approx. 9.5 cm/sec in the direction shown in Fig. 4-19 scale reading should be 100 g ~ 130 g (x 5 cm).
 5. Select a proper spring hook that provides tension scale reading of 100 g ~ 130 g (x 5 cm).

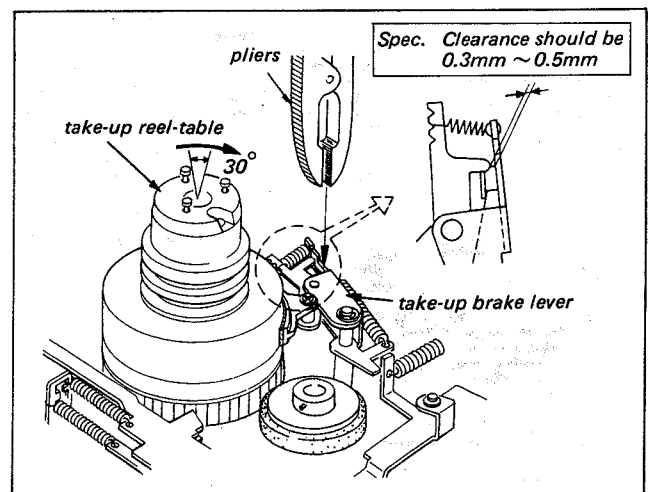


Fig. 4-18. Take-up reel-table brake torque adj.
(FR-STOP mode without tape)

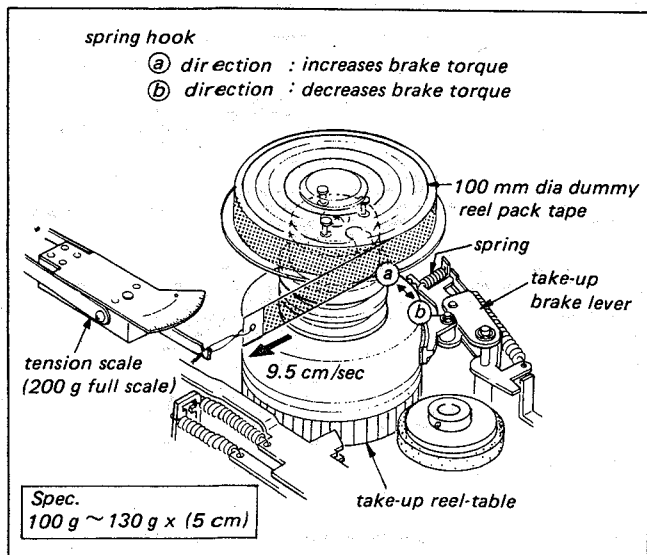


Fig. 4-19. Take-up reel-table brake torque adj.
(FR-STOP mode without tape)

4-4-4. Supply Brake Release Adj.

If this adjustment is incorrect, the Supply Reel-Table Brake is not released in the FWD or REC modes so that the too high the back tension may collapse the picture on the monitor.

1. Without threading tape, put the machine into the FWD mode.
2. Check to see that the clearance (A) in Fig. 4-20, between the S-Brake Lever shaft and Link (F) is 4 mm ~ 4.5 mm. If not, adjust it by moving the Supply Brake Release Lever-A with an 4 mm diameter eccentric screwdriver (Jig Ref. No. J-5)
3. Repeat the PAUSE → FWD modes several times and confirm the clearance.

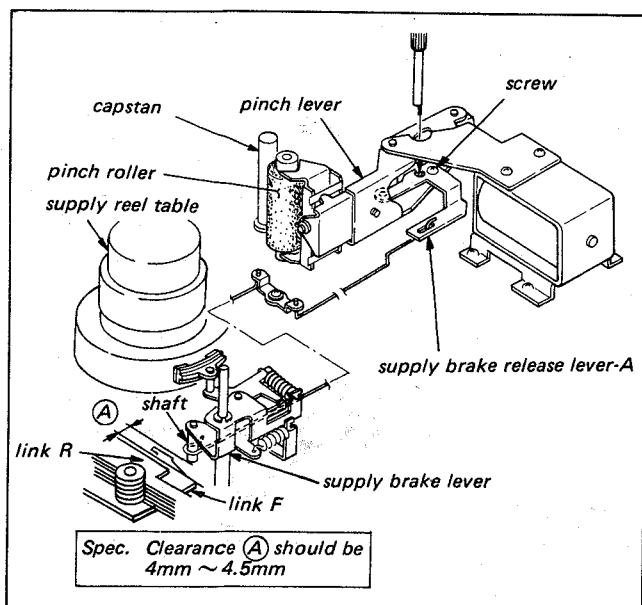


Fig. 4-20. Supply brake release adj.
(FWD mode without tape)

4-5. TENSION REGULATOR POSITION ADJUSTMENT

4-5-1. Supply Tension Regulator Position Adj. (FWD MODE)

1. Without threading tape, put the machine into the FWD mode.

< CAUTION >

Never turn OFF power. If power is turned OFF, the Supply Tension Regulator Pin will be forced to lock in that the FR-STOP position.

2. Check to see that the clearance between the Supply Tension Regulator Pin and the top flange of the Tape Guide-II on the Erase Head Base should be in between 7.7 mm and 8.1 mm. If not, loosen the screw shown in Fig. 4-21 and adjust the position of the Brake Band Bracket.
estimate of 8mm clearance; Use the Reel Table Height, Adj. Jig. (Jig Ref NO. J-14) as a thickness gauge because this jig has 8 mm thickness.

When this adjustment is attempted, perform the checks of the various values given in the following sections.

- Sec. 5-2. FORWARD mode tape hold-back tension adj.
- Sec. 5-4. F.Forward mode tape hold-back tension adj.
- Sec. 6-5. FF-REW tape run adj.
- Sec. 6-6. FORWARD mode tape run adj.

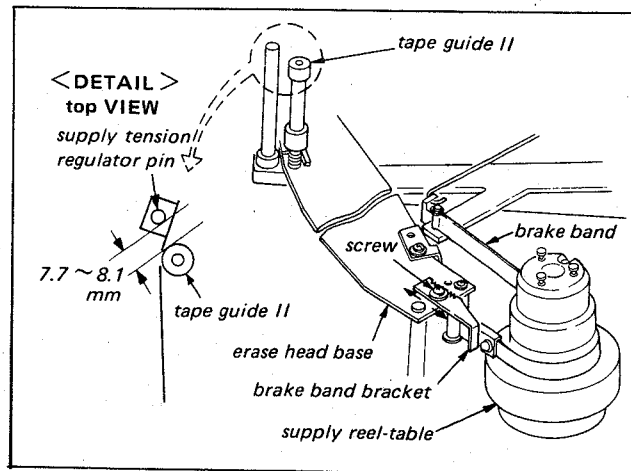


Fig. 4-21. Tension regulator pin position adj. (FWD mode)
(FWD mode without tape)

4-5-2. Take-up Tension Regulator Operating Position Adj.

- If the Take-up Tension Regulator Operating Position is incorrect, possible trouble of the machine is that the machine's mechanism cannot effectively control the tape tension, especially at the beginning of a reel of tape, so that an abnormally high tension will applied to tape and damages a tape. Even not in an extreme of tape damage, an incorrect T.Tension Regulator Operating Position makes impossible to take-up a tape at a constant tape tension so that tape is adversely affected.
- The Take-up Tension Regulator's Brake Shoe will wear out with elapsed time of machine operating hour. It is requested that check-out of Brake Shoe wearing is made when a machine comes into stop for repair.

1. Turn on the power. Without inserting a cassette tape, put the machine into the FWD mode while maintaining POWER ON. (Never turn OFF POWER that disables the tension regulator at all.)
2. Push the T.Tension Regulator fully to the left (in (A) direction) with finger as shown in Fig. 4-22 as far as it will go. Remove the finger gently from the T.Tension Regulator so that the T.Tension Regulator will slowly and naturally move to the right (in the (B) direction).
3. Measure the movable distance of the T.Tension Regulator from the position established by step 2, to the position where the T.Tension Regulator is blocked by the Stopper, shown in Fig. 4-22. Practical procedure of measurement. Measure the distance how far the T.Tension Regulator moves when it is pushed by a finger to the right (in (B) direction) until it is blocked by the Stopper from the position established by step 2. The movable distance should be 0.05 mm to 0.1 mm. If not, adjust the location of the P.Tension Regulator Stopper with use of 4 mm diameter eccentric screw driver (Jig Ref. No. J-5).
- Knack of this adjustment is to realize the purpose of this adjustment. Locate the Stopper beneath the T.Tension Regulator. This Stopper is shaped as  that determines the operating position of the T.Tension Regulator. Purpose of this adjustment is position the Stopper so that the T.Tension Regulator can make full use of the total length of the Stopper by moving from its left end to the right end.
4. After completing the adjustment, perform sec. 5-6 Overall Take-up Torque Measurement.

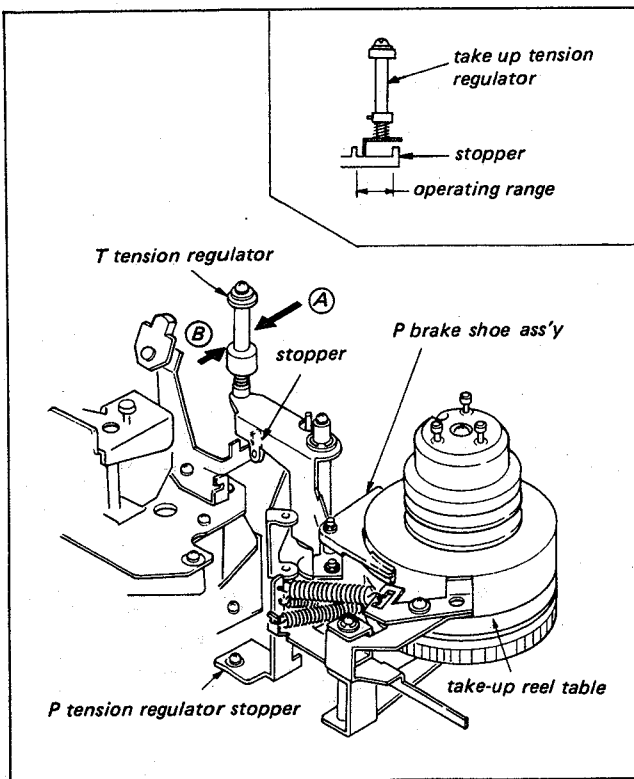


Fig. 4-22. T. tension regulator operating position adj. (Be sure POWER ON, in FWD mode without cassette.)

4-5-3. R.Tension Regulator Position Adj.

- If the R.Tension Regulator is left un-adjusted in the incorrect position, a constant hold-back tension on tape cannot be applied in the REW mode so that adverse effect on tape will result.
1. Without threading tape, put the machine into the REW mode, while maintaining POWER ON. (Never turn OFF POWER that disable the tension regulator at all.)
 2. Push the T.Tension Regulator fully to the left (in (A) direction) with finger as shown in Fig. 5-28 as far as it will go. Remove the finger gently from the T.Tension Regulator so that the T.Tension Regulator will slowly and naturally move to the right (in the (B) direction).
 3. Measure the movable distance of the T.Tension Regulator from the position established by step 2, to the position where the T.Tension Regulator is blocked by the Stopper, shown in Fig. 4-22. Practical procedure of measurement. Measure the distance how far the T.Tension Regulator moves when it is pushed by a finger to the right (in (B) direction) until it is blocked by the Stopper from the position established by step 2. The movable distance should be 0.05mm to 0.1mm. If not, adjust the location of the T.Tension Regulator Stopper with use of 4mm diameter eccentric screw driver (Jig Ref. No. J-5)

If not, adjust the position of the R.Tension Regulator Arm with a 4 mm diameter eccentric screwdriver (Jig Ref. No. J-5).

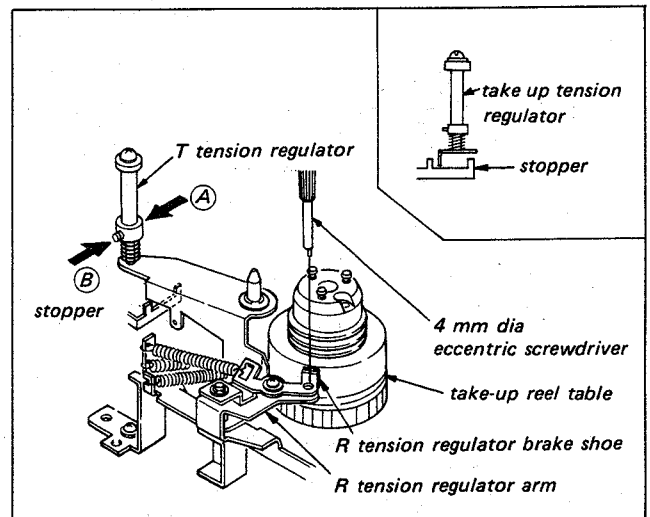


Fig. 4-23. R. tension-regulator position adj. (REW mode without tape)

4-5-4. Supply Tension Regulator Stopper Position Adj.

If the Supply Tension Regulator Stopper Position is incorrect, there is a danger that the Supply Tension Regulator Arm starts without drawing the tape of the cassette.

1. Without inserting cassette, put the machine into the FR-STOP mode.
2. Install the Position Jig (Jig Ref. No. J-13) as shown in Fig. 4-24.
3. Put the machine into the EJECT mode.

4. Check to see that two requirements are simultaneously met at (A) and (B) portions in Fig. 4-24.

Requirement-1 ; When (A) is in contact, Fig. 4-25, (B) should be in contact or the clearance should be less than 0.2 mm.

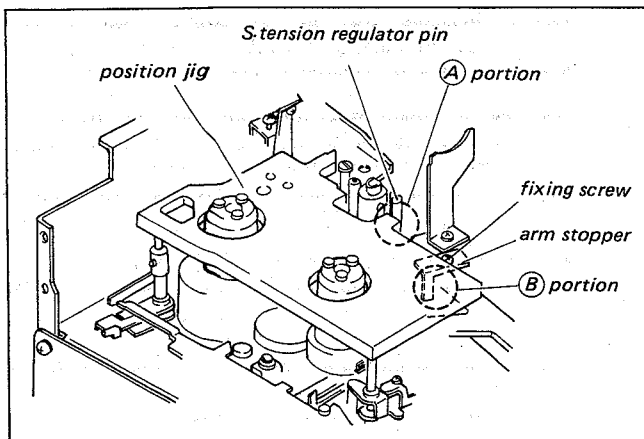


Fig. 4-24. Supply tension regulator stopper position adj. (EJECT mode without tape)

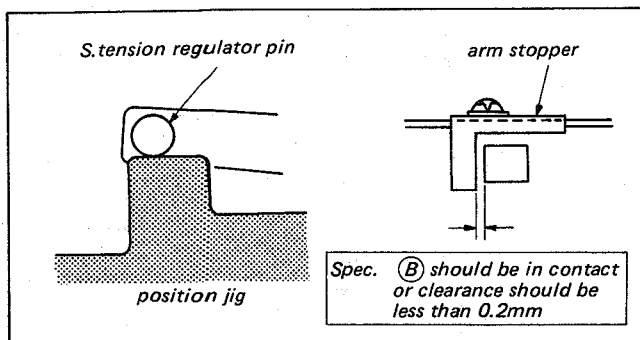


Fig. 4-25. When (A) portion is in contact

Requirement-2; When (B) is in contact, Fig. 4-26, (A) should be in contact, or the clearance should be less than 0.3 mm.

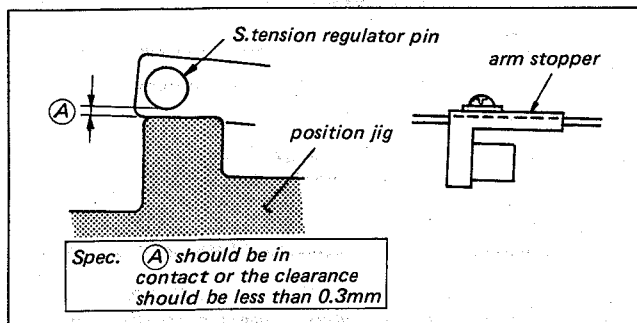


Fig. 4-26. When (B) portion is in contact

If the above two requirements cannot be met, proceed to the step 5.

5. Loosen the fixing screw of the Arm Stopper referring Fig. 4-24. Adjust the Arm Stopper to meet the two requirements in step 4.

4-5-5. Supply Tension Regulator Position Adj. (REW Mode)

If this portion of the mechanism is showing incorrect operation, the Supply Tension Regulator will vibrate in the starting period of the REW mode so that the prospective trouble may be unstable tape running in the REW mode. (When this portion of the mechanism is operating correctly, the Supply Tension Regulator will move only 1mm during rewind.)

< CHECK procedure >

1. Without threading tape, put the machine into the FR-STOP mode.
2. Prepare 200g-full-scale tension scale. Hold the tension scale with hand and push the Supply Tension Regulator Pin with top end of the tension scale probe to the reel table, and showing 100g. If the Supply Tension Regulator Pin moves more than 1mm when pushed with 100g. proceed to step 3, adjustment.

< ADJUSTMENT procedure >

3. Without threading tape, put the machine into the FR-STOP mode.
4. Loosen the fixing screws "A" and "B" 1/2 turns as shown in Fig. 4-27.
5. Set the screwdriver with gear (Jig Ref. No. J-27) to the hole of tension regulator connecting link.
6. Once turn the screwdriver with gear to counter-clockwise direction (↺).
7. Turn the screwdriver with gear to clockwise direction (↻) until to move the Stop Lever in the direction shown by arrow in Fig. 4-27.
8. Tighten the two fixing screws.
9. After this adjustment, perform the sec. 6-5 F-Forward and Rew mode Tape Run Adj.

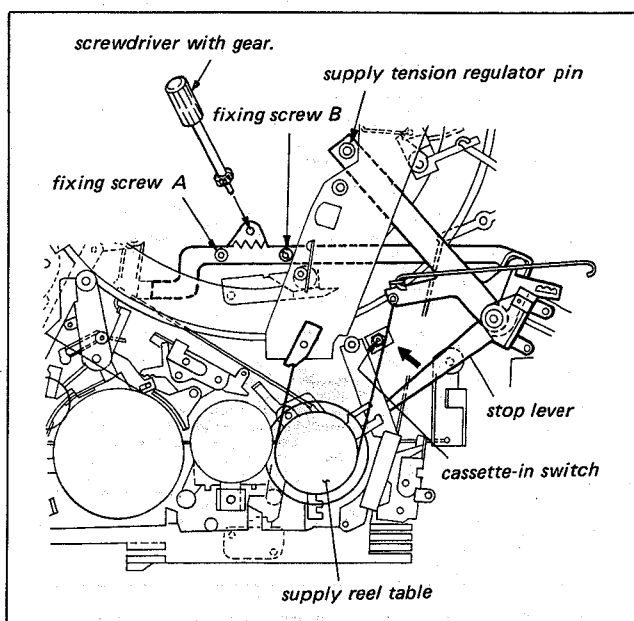


Fig. 4-27. S.tension regulator position adj. (REW mode) (FR-STOP mode without tape)

4-5-6. Supply Tension Regulator Pin Movable Range Adjustment (FF Mode)

- If this adjustment value is less than 0.5 mm, the prospective trouble is that the tape hold-back tension becomes weak during the Fast Forward mode.
 - If this adjustment value is in contrary, more than 2 mm, the possible trouble is that the Main Solenoid does not fully energize that drives all the mechanism into the Fast Forward position.
1. Without threading tape put the machine into the F.F. mode.
 2. Check to see that the clearance (A) in Fig. 4-28, between the Stop Lever and the F-F Lever is 0.5mm ~ 2.0mm. If not, adjust it by bending the F-F Lever.

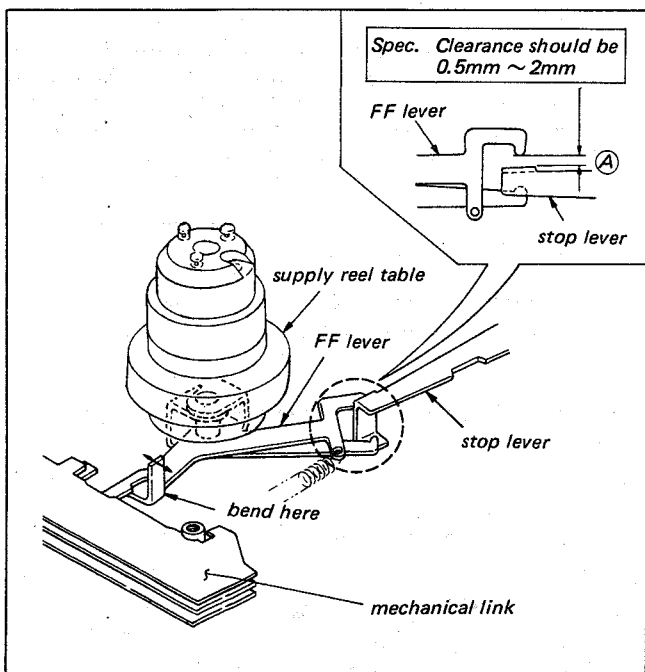


Fig. 4-28. Supply tension regulator pin movable range adj. (FF mode without tape)

4-6. TAPE THREADING SYSTEM ADJUSTMENT

4-6-1. Threading Ring Rotation Adj.

- If the Threading Ring is left unadjusted to have narrower clearance, the Ring rotation becomes heavy' or if left to have wider clearance, tape run during threading and during normal FWD modes will be unstable.
 - This adjustment is required only when the Threading Ring is replaced or removed. It is usually not required. The Erase Head Base should be temporarily removed during the course of this adjustment.
1. Put the machine into the FR-STOP mode.
 2. Check to see that the play in the horizontal direction of the Threading Ring is 0.2mm ~ 0.6mm.
 3. Check to see that the rotation of the Threading Ring into the threading and unthreading modes are smooth.

4. If steps 2 and 3 requirements are not met, locate the Erase Head Base and locate then the Ring Roller Bracket beneath the Erase Head Base. Insert a 0.3 mm thick paper between the Ring Roller and the Threading Ring. Paper of this service manual is 0.1 mm thick so that the three fold becomes 0.3 mm thick. Adjust then the Ring Roller Bracket position for approx. 0.3 mm.
5. Perform the following adjustment.
 - sec. 4-5-1. Supply Tension Regulator Position Adj. (FWD mode)
 - sec. 5-2. FWD mode, Tape Hold-back Tension Adj.
 - sec. 5-4. FF mode, Tape Hold-back Tension Adj.

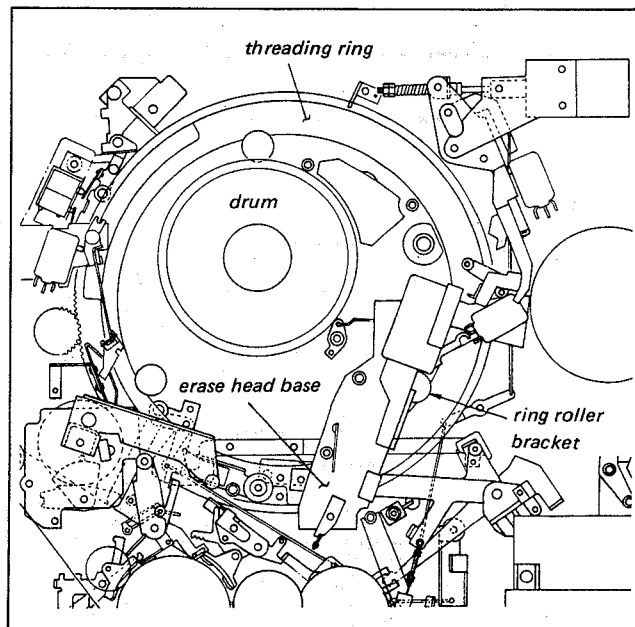


Fig. 4-29. Threading ring rotation adj. (FR-STOP mode without tape)

4-6-2. Gear Box Position Adj.

- It is required that the sec. 4-6-1 Threading Ring Rotation Adj. is checked to be correct or properly adjusted before initiating this adjustment.
 - This adjustment is required only when a Gear Box is removed and is then installed into the machine. It is not required in usual maintenance.
 - The following adjustment procedure begins in the state of a machine that a Gear Box is already removed earlier.
1. Without threading tape, put the machine into the FR-STOP mode and turn the POWER OFF.
 2. Turn the Gear of the Threading Arm Ass'y in the counter-clockwise direction as far as it turns with finger tip as shown in Fig. 4-30.
 3. Install the Margin Gear on the Gear Box Shaft. Do not tighten the screws.
 4. Mount the Gear Box Ass'y to the slant chassis from rear of the machine. When mounting the Gear Box Ass'y, bring the assembly so that the Margin Gear and the Threading Ring are engaged.

Install the Gear Box Ass'y so that about 0.2 mm ~ 0.3 mm clearance exists in B direction between the Margin Gear and the Threading Ring while pressing the Ass'y all the way in the A direction as shown in Fig. 4-30. Tighten the two fixing screws, marked C and D.

5. Turn the Threading Ring with finger until the Pinch Roller is positioned in the EJECT position.
6. Turn the POWER SW ON, put the machine into the EJECT mode by pressing the EJECT button.
7. Tighten the fixing screw E.
8. Adjust the Margin Gear Position referring sec. 4-3-1 Margin Gear Position Adj.

After this adjustment perform the following adjustments.

- sec. 4-3-2 ; Threading Arm Stopper Position Adj.
sec. 4-3-3 ; FR Unthread-End Switch Position Adj.

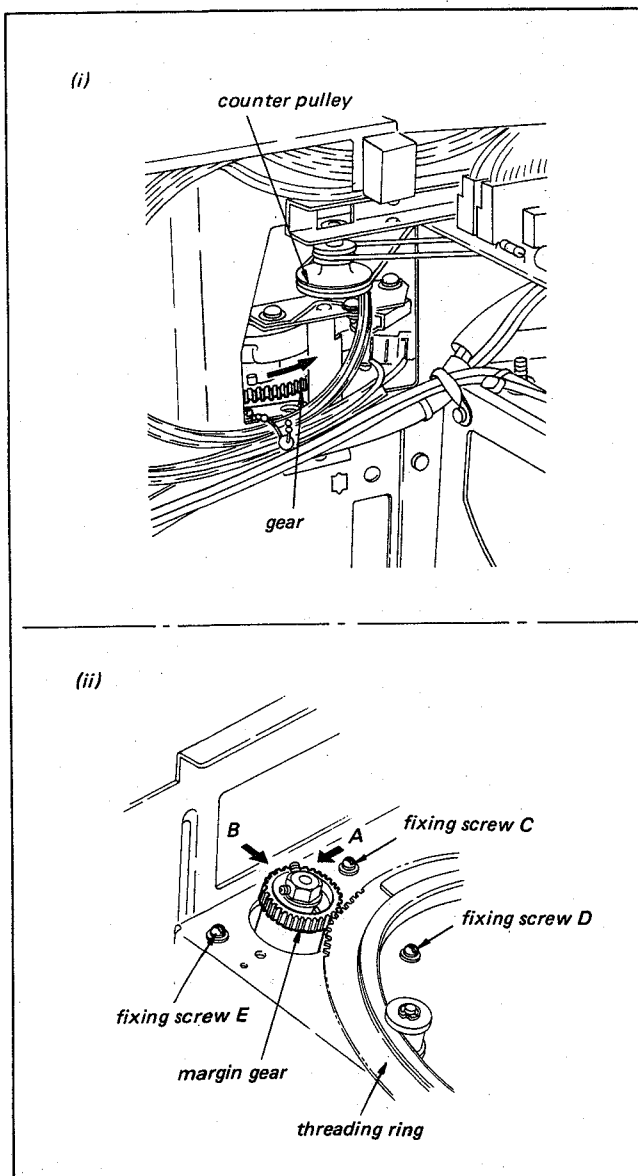


Fig. 4-30. Gear box position adj.

4-7. SWITCH SYSTEM ADJUSTMENT

4-7-1. AC Motor SW Position Adj.

- If the AC Motor Switch position is left in an incorrect position, the possible trouble is that a AC Motor will not start turning even after any of the function button is pressed. Another possible trouble is that the AC Motor will not stop turning even the machine is put in the FR-STOP mode.
1. Put the machine into the EJECT mode.
 2. Turn the POWER OFF, and push the Brake Link Lever slowly in the direction indicated by an arrow A, in Fig. 4-31. And check to see that the traveling distance is more than 5 mm after the AC Motor Sw is turned ON. If not, adjust the AC Motor Sw position.
 3. Push the Brake Link Lever slowly in the direction by an arrow A so that the AC Motor Sw is turned ON, and then reversely move it to its original position. Check to see that there are clearances in C and D of Fig. 4-31. (C is the clearance between the Brake Link Lever and the Actuator, D is the clearance between the Actuator and section E of the microswitch.) If not, re-adjust the step 2.
 4. Check to see that the Grease is lubricated on the Actuator where is contacting the Brake Link Lever. If not, lubricate the light Grease (recommended the SONY GREASE, part No. 7-662-001-22 or 7-662-001-41) on the Actuator. Don't apply oil.

<CAUTION>

Never apply grease on the actuator's micro-switch contacting side.

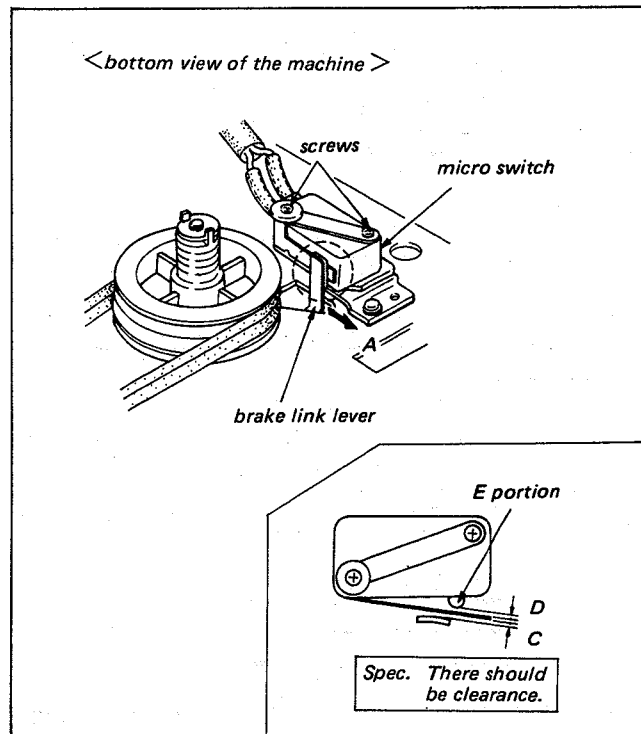


Fig. 4-31. AC motor SW position adj.
(Power OFF and EJECT mode)

4-7-2. Cassette-in Switch Push Rod Height Adjustment

- If the Cassette-in Switch Push Rod is not high enough (lower than the requirement), tape threading will not start even though a cassette is inserted in a machine because Cassette-in Switch Push Rod does not reach the Cassette in Micro Switch.
 - If, oppositely, the Cassette-in Switch Push Rod is too high, a cassette cannot drop down to the required position because the cassette-drop is blocked by the Push Rod's top, so that tape run is adversely affected by incorrect tape height.
 - This adjustment is usually not required, but required when the cassette-in micro switch is replaced.
1. Put the machine into EJECT-completed state. Turn the POWER OFF.
 2. Press down the top of the Push Rod gently until click sound is heard, indicating that the Cassette-in Switch is turned ON. Check to see that the position of the top of the Push Rod is located higher than the Cassette Support Pillar, as observed visually in the moment of click sound as shown in Fig. 4-31 (i).
If adjustment is necessary, proceed to step 4 for adjustment to meet both step 2 and step 3 requirements.
 3. Press down the top of the Push Rod as far as it will go, with finger. Check to see that the top of the Push Rod is positioning lower than the Support Pillar as shown in Fig. 4-31 (ii). If adjustment is required, proceed to step 4 for adjustment to meet both step 2 and step 3 requirements.

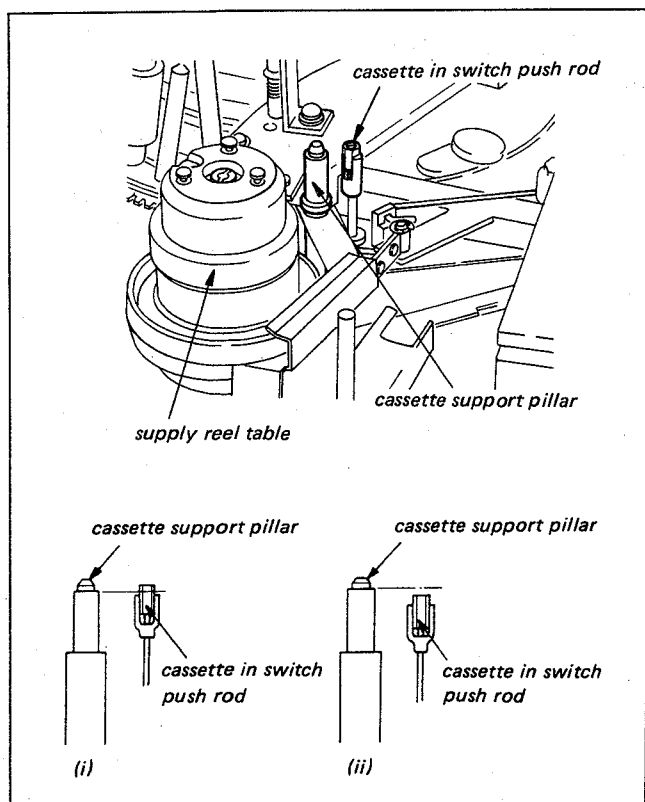


Fig. 4-31. Cassette-in switch push rod height adj. (EJECT mode, power OFF)

4. Adjust the height of the Cassette-in Push Rod by turning the yellow-colored nut on its top.
 - Turning the nut 60 degrees corresponds to 0.06 mm change in the height.
 - If adjustment cannot be properly performed, refer step 5.
5. If step 4 adjustment cannot be properly performed (occurring due to difference in ON point in respective micro switch), bend the Actuator of micro switch as shown in Fig. 4-31 slightly, and re-adjust in accordance with step 4.

4-7-3. Cassette-up Switch Position Adj.

- If the Cassette-up Switch Position is incorrect, tape threading will not start in the moment of cassette insertion.
1. Put the machine into EJECT-completed state.
 2. Push the Lock Lever with finger in the arrow direction shown in Fig. 4-32 as far as it will go. Observe clearance between micro-switch side face and the Lock Lever at around the sensing protrusion of the micro switch. The clearance of 0.4 mm to 0.8 mm should be observed. If not, adjust the mounting position of the micro switch.

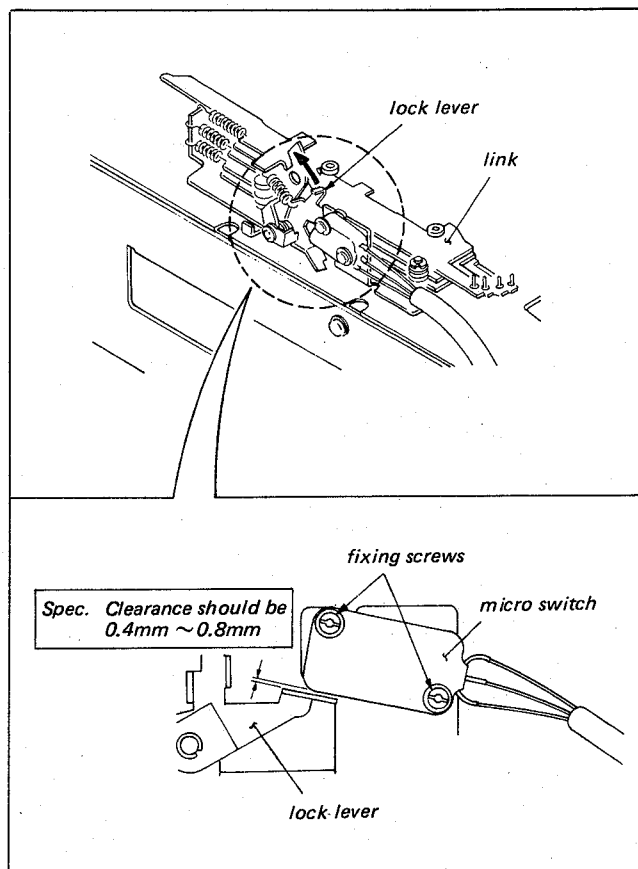


Fig. 4-32. Cassette-up switch position adj. (EJECT mode)

4-8. STILL-ADJUST ADJUSTMENT

- This machine has the STILL-ADJUST mechanism that has claw (called as the ST Cam) which turns the Supply side reel-table as the STILL-ADJUST knob is pulled in the STILL mode. The tape is supplied from the Supply side reel-table for a certain amount of tape that is taken-up by the Take-up reel-table. This claw should be normally detached from the Supply reel-table in other modes of the FWD, F.FWD, REW and EJECT modes. However, if this STILL-ADJUST mechanism is incorrect, the possible trouble is that the claw keeps contacting the Supply side reel-table even in the FWD mode to cause buzzing noise.

<Check Procedure>

- Without threading tape, put the machine into the FWD mode.
- While the machine is in the FWD mode, hold the Supply Reel-Table with fingers. Turn the Supply Reel-Table 180 degree in the clockwise direction with finger and check that the buzzing noise is not generated from the lower portion of the Supply Reel-Table. (The FWD Back Tension's Brake Band only is working on the Supply Reel-Table in this state.) If sound is heard, adjust in accordance with step 4.
- Press then the PAUSE button to put the machine into the STILL mode. Check to see that the Supply Reel-Table turns approx. 2 degrees in clockwise as the STILL ADJUST knob is pulled. If the Supply Reel-Table does not turn even though the STILL ADJUST knob is pulled, proceed to the step 4 for adjustment.

<Adjustment Procedure>

- Without threading tape, put the machine into the FWD mode.
- Adjust position of the Adj. Plate shown in Fig. 4-33 in the direction shown with screw driver tip so that clearance between tip of the ST Cam and surface of the Supply Reel-Table is 1 mm ~ 2.5 mm as observed by eye.
- Insert the connector CN341 on the EC board of the Erase Head Base. Detach the black colored vinyl insulation tape that is temporarily attached on the two photo-transistors. Playback a KCA-type or KCS-type (still possible) pre-recorded tape and observe the playback picture in STILL mode. Check to see that guard band noise on the monitor screen shifts showing that STILL-ADJUST is possible as the STILL-ADJUST knob is pulled.

Note: If a STILL-impossible tape of the KC type cassette is played back in PAUSE while the STILL-ADJUST knob is pulled repeatedly, (no picture is visible on monitor because of KC type,) tape can slackens around the Erase Head Base so that the photo lamp light will reach the supply photo-transistor and puts the machine into REW mode. It is due to no tape Take-up by the Take-up Reel-Table while tape is supplied from the Supply Reel-Table as the STILL-ADJUST knob is pulled. This phenomena is normal, not the machine trouble.

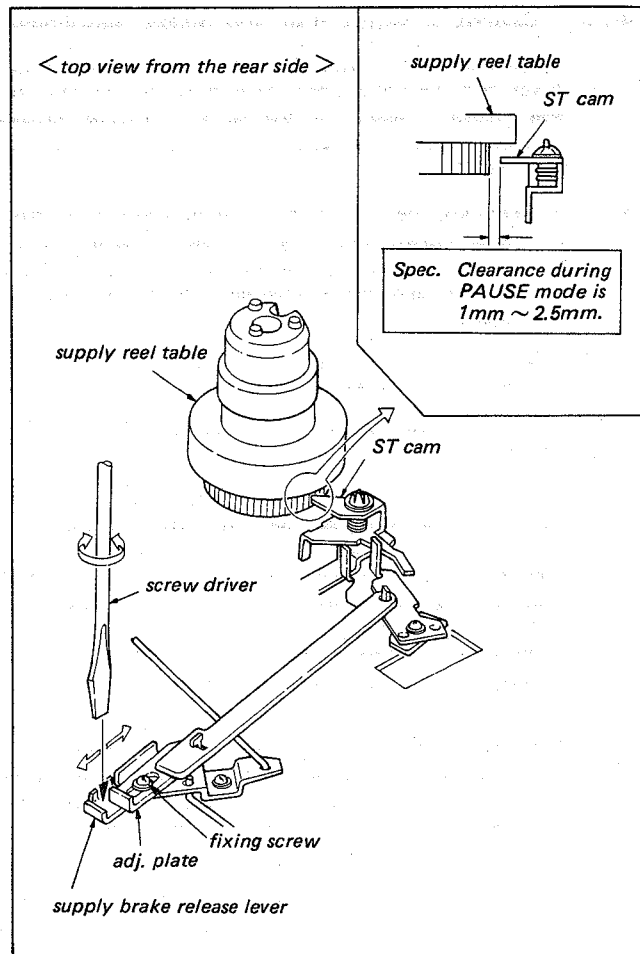


Fig. 4-33. STILL ADJUST adjustment (FWD mode without tape)

SECTION 5

BACK TENSION AND TORQUE ALIGNMENT

5-1. THREADING BACK TENSION ADJUSTMENT

- If the Threading Back Tension is high, the tape-to-head contacting pressure becomes abnormally high so that the possible trouble is to give scars (trace scar) on tape due to video heads. The machine having the auto-repeat feature performs the tape threading at a certain same portion of a tape so that the specific portion of the tape is damaged very easily.
 - If the Threading Back Tension is low, tape provides an extra slack in an occasion of cassette-in and results in possible trouble of tape threading error, or trouble of no still picture in still mode due to insufficient tape-to-head tension.
1. Without threading tape, put the machine into the EJECT mode. (Only the Threading Brake is ON upon the Take-up Reel Table.)
 2. Install a 100 mm diameter dummy reel pack tape (Jig Ref. No. J-7) on the Take-up Reel-Table.
 3. Hook a tension scale (50 g full scale) (Jig Ref. No. J-15) on an end of dummy reel pack tape. Pull out the tape at the constant speed of approx. 9.5 cm/sec in the direction shown in Fig. 5-1. Scale reading should be 15 g ~ 25 g (x 5 cm).
 4. If incorrect, adjust by bending the spring hook for 15 g ~ 25 g.
 5. Clean all the parts/components that contacts with the brake shoe of the reel table with cloth moistened with methanol. After cleaning, check the tension again of step 4 for confirmation.

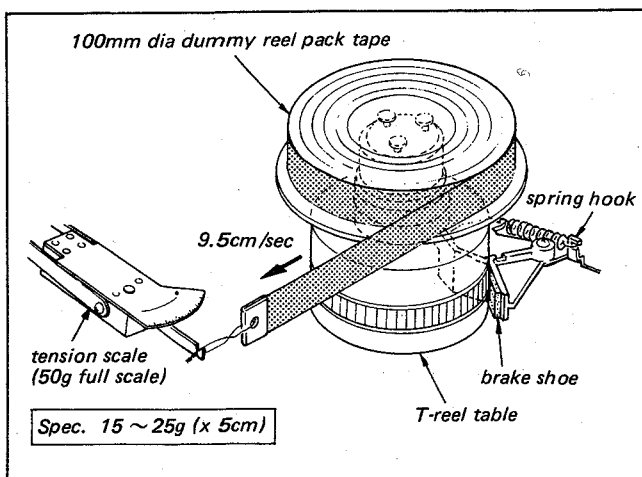


Fig. 5-1. Threading back tension adj. (EJECT and power OFF mode)

5-2. FORWARD MODE, TAPE HOLD-BACK TENSION ADJUSTMENT

- This adjustment is required whenever replacement of the Brake Band, Supply Reel-Table or Supply Tension Regulator is made or adjustment of the Supply Tension Regulator Pin position adj. (FWD) is made.
 - Check to see that sec. 4-5-1 Supply Tension Regulator Pin position adj. (FWD) is correct before initiating this adjustment.
 - If this adjustment is incorrect to have lower tension than specified, good head-to-tape contact cannot be obtained so that one of possible troubles is fluctuation of chroma level on top of picture.
1. Without threading tape, put the machine into the FR-STOP mode. Install the FWD Back Tension Measurement Jig (Jig Ref. No. J-11) on the machine as shown in Fig. 5-2, with two screws.
 2. Install the Back Tension Adj. Jig (Jig Ref. No. J-12).
 3. Install a 38mm diameter dummy reel pack tape (Jig Ref. No. J-8) on the Supply Reel-Table as shown in Fig. 5-2. And thread the tape as shown in Fig. 5-2. (Tape should be wound around the reel hub in the clockwise direction of 38mm diameter reel pack.) Put the machine into the FWD mode.
 4. Hook a tension scale (100 g full scale) (Jig Ref. No. J-16) on an end of tape and pull it at the constant speed of approx. 9.5 cm/sec speed in the direction shown by Fig. 5-2.
 5. Check that the scale reading is 85 g ~ 90 g.
 6. If the scale reading does not meet requirement, adjust the position of the SKEW spring hook with an eccentric screw driver (Jig Ref. No. J-5).
 7. Put the machine into the FR-STOP mode and remove the FWD Back Tension Measurement Jig from the machine.

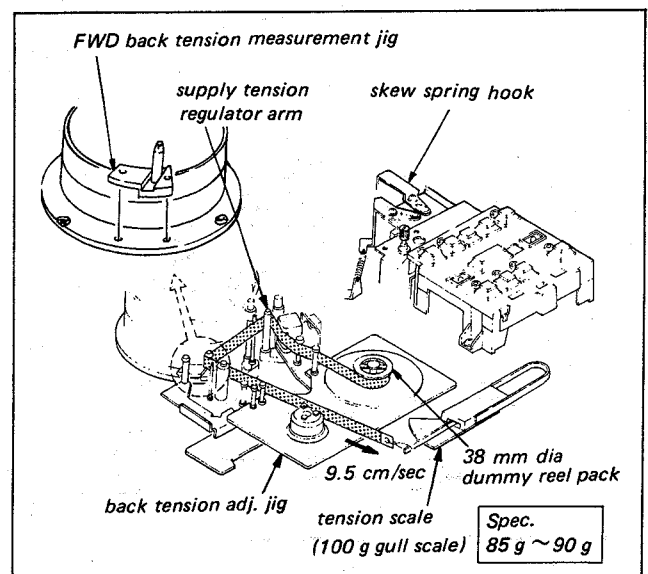


Fig. 5-2. FWD back tension adjustment (FWD mode)

<CAUTION>

Do not press the EJECT button with the FWD Back Tension Measurement Jig installed on the machine. If it should be pressed, the Threading arm of the machine's mechanism will collide with the Measurement Jig so that the Arm may bend. Be sure to remove the Jig before pressing the EJECT.

5-3. REWIND MODE, TAPE HOLD-BACK TENSION ADJUSTMENT

- This adjustment is required when the Take-up reel-table is replaced or REW Tension Regulator Arm is replaced, or Rew Tension Regulator position is adjusted.
 - If this adjustment is left incorrectly higher value than specification, the possible trouble is that tape stops running in REW mode, at the end of a reel of tape.
 - If, oppositely, the Rewind Tape Tension is left lower than specifications, possible trouble is that the tape is wound around the reel-hub loosely which can result in so called "windowing" where window is produced between the tape layers as tape happens to be pulled momentarily with big force in tape longitudinal direction.
1. Without threading tape, put the machine into the FR-STOP mode.
 2. Install the Back Tension Adj. Jig (Jig Ref. No. J-12) on the machine as shown in Fig. 5-3.
 3. Install a 100mm diameter dummy reel pack tape (Jig Ref. No. J-7) on the Take-up Reel-Table and thread the tape as Fig. 5-3.
(The tape should be wound around the reel-hub of the 100 mm diameter reel-pack in clockwise direction).
 4. Put the machine into the REW mode. Hook a tension scale (100 g full scale) (Jig Ref. No. J-16) on an end of the tape and pull it at the constant speed of approx. 9.5 cm/sec speed in the direction shown in Fig. 5-3.
 5. Check to see that scale reading is 50 g ~ 70 g. If not, select proper position of the spring hook.

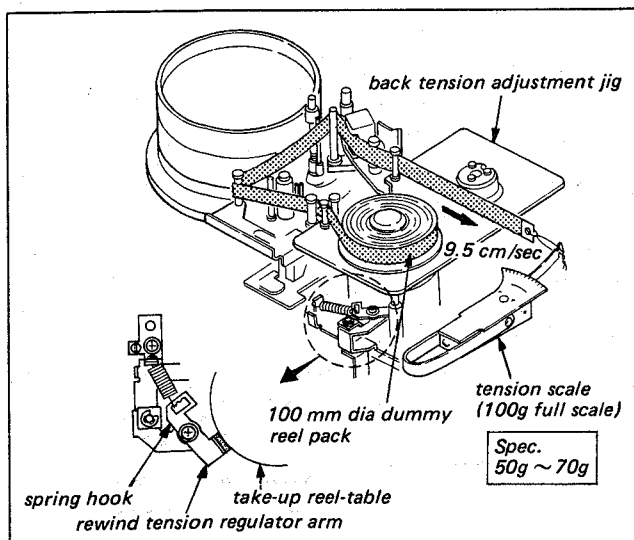


Fig. 5-3. Rewind back tension adjustment (REW mode)

5-4. FAST-FORWARD MODE, TAPE HOLD-BACK TENSION ADJUSTMENT

- This adjustment is required when replacement of Brake Band, Supply Reel-Table or Supply Tension Regulator is performed, or when the Supply Tension Regulator Pin Position Adj. (FWD) is made.
 - Confirm the Section 4-5-1 Supply Tension Regulator Pin Position Adj. (FWD) is fully met or adjusted, before initiating this adjustment.
 - If FF mode Tape Hold Back Tension is higher than the specified value, tape is wound around the Supply Reel-Table too tight, tape is adversely affected.
 - If FF mode Tape Hold Back Tension is lower than the specified value, tape is wound around the reel-hub loose that can result in uneven tape winding when tape is pulled with strong force.
1. Without threading tape, put the machine into the FR-STOP mode.
 2. Install the Back Tension Adj. Jig (Jig Ref. No. J-12) as shown in Fig. 5-4.
 3. Install a 100mm diameter dummy reel pack tape (Jig Ref. No. J-7) on the Supply Reel-Table and thread the tape as shown in Fig. 5-4.
(Tape should be wound around the reel-hub in the clockwise direction earlier.)
 4. Put the machine into the F.FWD mode.
Hook a tension scale (100 g full scale) (Jig Ref. No. J-16) on an end of tape and pull it at the constant speed approx. 9.5 cm/sec speed in the direction shown by Fig. 5-4.
 5. Check to see that the tension scale reading is 80 g ~ 90 g. If not, adjust the position of the Cancel Spring hook with an eccentric screwdriver (Jig Ref. No. J-5).

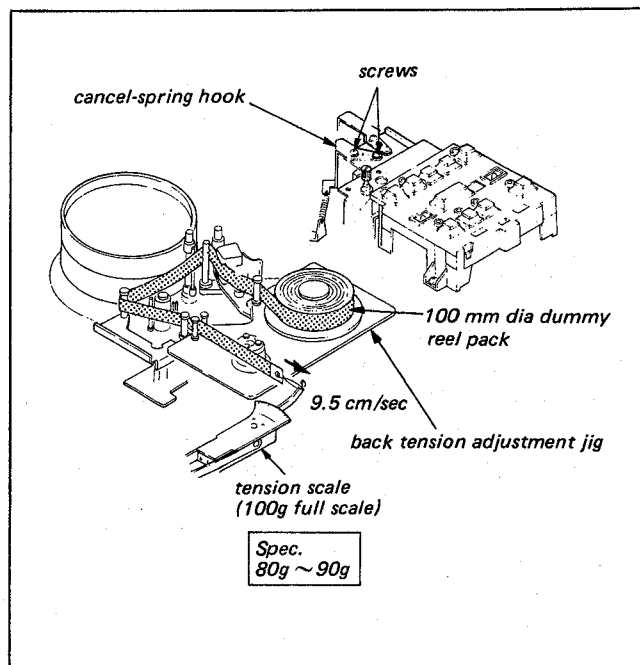


Fig. 5-4. F.FWD back tension adjustment (F.FWD mode)

5-5. FORWARD TORQUE CHECK (TAKE-UP REEL TABLE)

- If the Take-up Reel-table Forward Torque is higher than the specified value, the possible trouble is scars to be given to tape due to high tape tension, during the FWD mode (especially at tape beginning), and during the tape unthreading.
 - If the Take-up Reel-table's Forward Torque is lower than the specified value, torque is not sufficient to take-up at the tape-end so that tape will have slack around the Capstan Shaft and activates the FWD Slack Switch.
1. Install a 100 mm diameter dummy reel pack tape (Jig Ref. No. J-7) on the Take-up reel-table as shown in Fig. 5-5.
 2. Put the machine into the FWD mode.
 3. Hook a tension scale (200 g full scale) (Jig Ref. No. J-17) on an end of tape and let the tape pulled at the constant speed approx. 9.5 cm/sec speed.
 4. Check to see that tension scale reading is 85 g ~ 140 g (x 5 cm).
 5. If not, replace the Take-up Reel-Table. Check the Reel-table height and vertical play by sec. 4-1. Proceed then to the torque check by step 1 through step 4.
 6. When this adjustment is attempted, perform the checks of the various values given in the following section.
- 5-6. Overall forward take-up torque check.

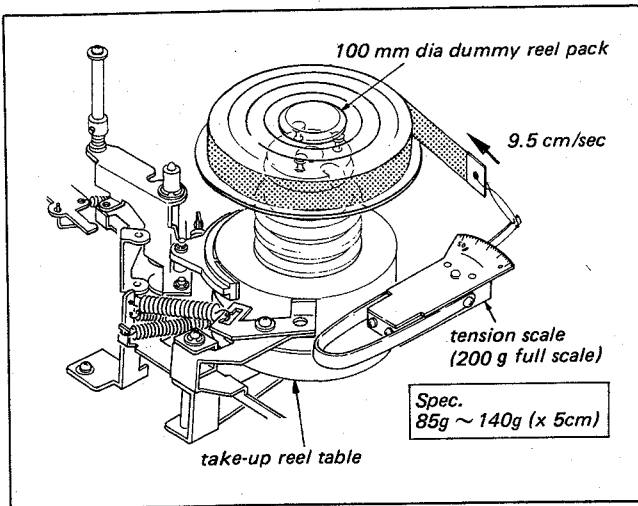


Fig. 5-5. FWD torque check (FWD mode)

5-6. OVERALL FORWARD TAKE-UP TORQUE CHECK

- This check/adjustment section measures the actual take-up torque to be applied to the tape, as a result of an entire mechanism system that controls the tape tension in the FWD mode. Since this tension control mechanism system comprises the Reel-table Torque, Reel-table surface conditions, Take-up Tension Regulator Operating Position, etc., this overall Forward Take-up Torque Check should be initiated after the Take-up Reel-table Take-up Torque (sec. 5-5) and the Take-up Tension Regulator Operating Position (sec. 4-5-2) are already finished earlier.

- If the overall Forward Take-up Torque is too high, the tape tension exceeds beyonds the controllable limit so that tape will have scars as the result, even though the Reel-table Take-up Torque and the T.Tension Regulator Operating Position are correct respectively.
 - T.Tension Regulator Operating Position will change gradually with the elapsed time. It is requested to check the Overall Forward Take-up Torque whenever a machine comes into repair shop.
1. Install a 100 mm diameter dummy reel pack tape (Jig Ref. No. J-7) on the Take-up Reel-table as shown in Fig. 5-6.
 2. Put the machine into the FWD mode.
 3. Push the Take-up Tension Regulator to the LEFT as far as it goes.
 4. While pushing the T.Tension Regulator to the LEFT, measure the Forward Torque in the same manner as sec. 5-5.
 5. Check to see that the scale reading is less than 50 g (x 5 cm).
 - Scale reading of 0 g will do.
 - If scale reading has fluctuation, take the maximum value.
 6. If the scale reading does not meet requirement, replace either one or both of the Take-up Reel-Table and its brake shoe.

After replacement, proceed to the following adjustments:

- Take-up Reel-Table:
 - Sec. 4-1-1. T.Reel-Table Height Adj. (including vertical play adj.)
 - Sec. 5-5. Forward Torque Check
- P.Brake Shoe
 - Sec. 4-5-2. Take-up Tension Regulator Operating Position Adj.

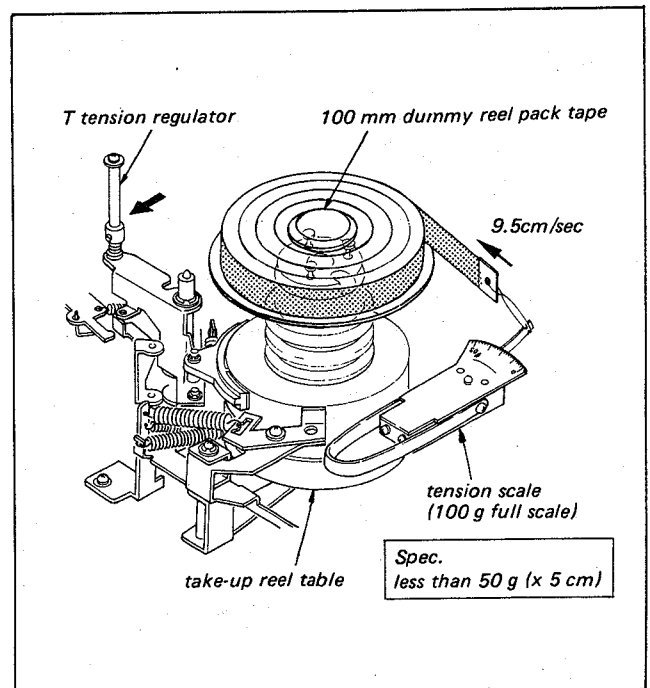


Fig. 5-6. FWD torque check (overall) (FWD mode)

5-7. REWIND TORQUE ADJUSTMENT

- If the Rewind Torque is lower than the specification, possible trouble is that tape rewinding will stop at nearly end of rewind.
- 1. Put the machine into the FR-STOP mode.
- 2. Install a 100 mm diameter dummy reel pack on the Supply Reel-Table.
- 3. Put the machine into the REW mode.
- 4. Hook a tension scale (500 g full scale) (Jig Ref. No. J-18) on an end of tape and let the tape be pulled at the constant speed of approx. 9.5 cm/sec as shown in Fig. 5-7.
- 5. Check to see that the scale reading is 240 g ~ 350 g (x 5 cm). If not, select proper position of the pawl of the FF/REW pulley. See Fig. 5-8.
- Adjust by inserting pliers tips into hole and pawl, as shown in Fig. 5-8.
- Turning the pawl ⤵ clockwise increases torque.
- Turning the pawl ⤴ counter-clockwise decreases torque.
- Each step of pawl changes 30 g (x 5 cm) torque.

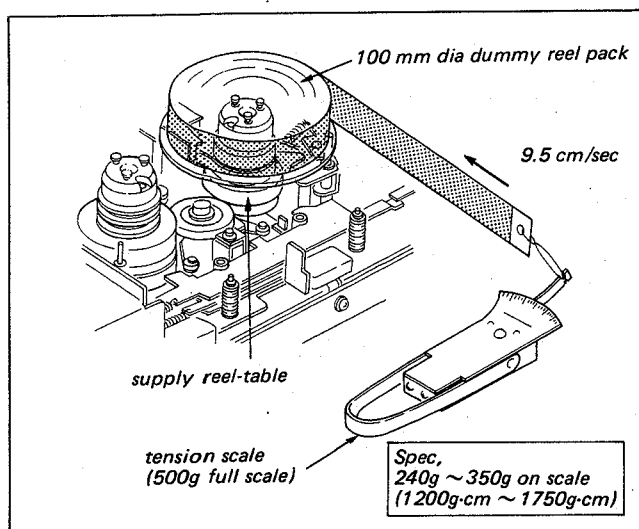


Fig. 5-7. Rewind torque adj. (REW mode)

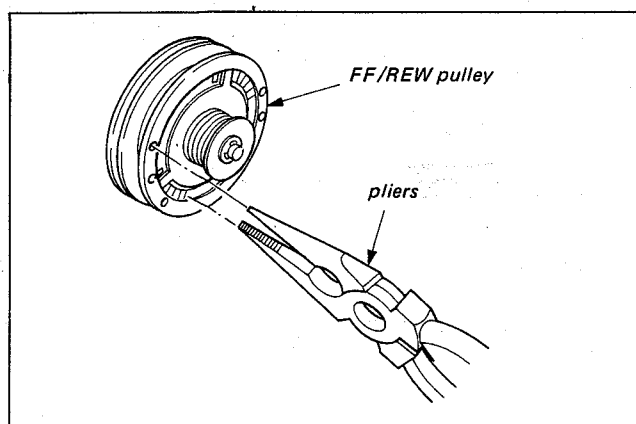


Fig. 5-8. Rewind torque adjustment

5-8. FAST-FORWARD TORQUE CHECK

1. Put the machine into the FR-STOP mode.
2. Place a 100 mm diameter dummy reel pack tape (Jig Ref. No. J-7) on the Take-up Reel Table.
3. Put the machine into the Fast Forward mode.
4. Hook a tension scale (500 g full scale) (Jig Ref. No. J-18) on an end of tape. Let the tape be pulled at the constant speed of approx. 9.5 cm/sec. See Fig. 5-9.
5. Check to see that the scale reading is higher than 300 g (x 5 cm). If not,
 - (i) Clean surface of the FF/REW Idler, and that of the Take-up Reel-Table. See Fig. 5-10.
 - (ii) Adjust the Rewind Torque, referring sec. 5-7.

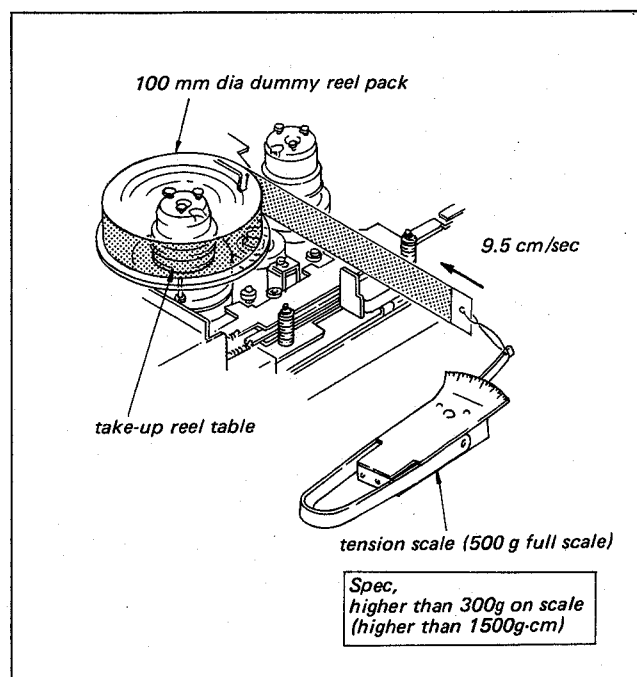


Fig. 5-9. Fast forward torque check (Fast-forward mode)

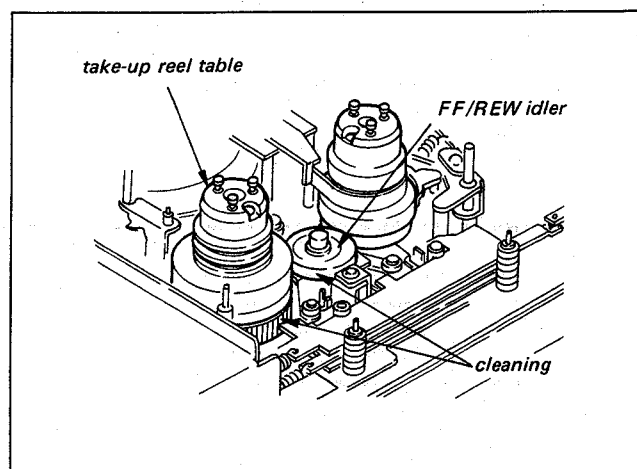


Fig. 5-10. Cleaning points

SECTION 6 TAPE RUN ALIGNMENT

6-1. PINCH ROLLER STOPPER POSITION ADJ.

- If the Pinch Roller Stopper Position is left incorrectly to have narrower gap than specification value, the Pinch Roller pressure against the Capstan will be lowered so that the possible trouble is not advanced at the rated speed.
 - If, oppositely, the gap is wider than specification, the Pinch Solenoid cannot pull the iron core even though the Pinch Solenoid is energized.
1. Thread tape and put the machine into the FWD mode.
 2. Check to see that the clearance (B) shown in Fig. 6-1 exists between the Pinch Roller Stopper and the Pinch Lever, for 0.3 mm ~ 0.5 mm. If not, adjust the position of the Pinch Roller Stopper.
 3. Repeat pressing the PAUSE button several times and confirm the clearance (B).

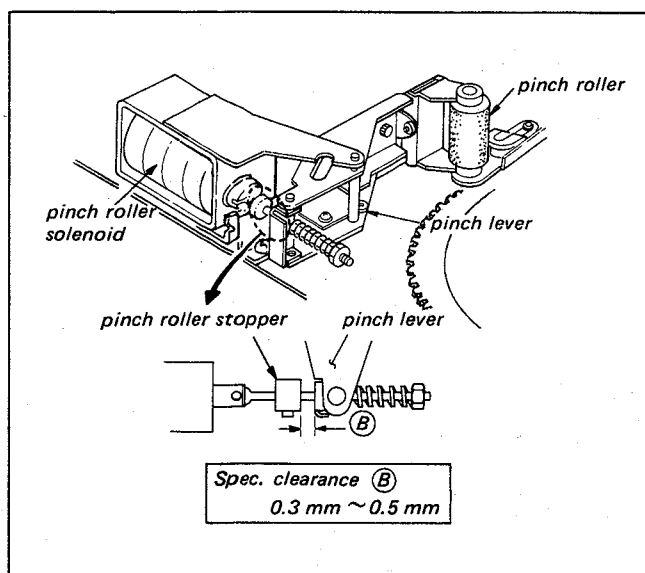


Fig. 6-1. Pinch roller stopper position adj.
(FWD mode with tape)

6-2. PINCH LEVER RIGHT ANGLE ADJUSTMENT

- This adjustment is precisely factory-calibrated before shipment so that no adjustment is required in ordinary use of equipment. If this adjustment is incorrect, it is possible to cause adverse effect on the tape when the tape passes over the Capstan.
1. Put the machine into the EJECT mode, turn the POWER SW OFF.
 2. Install the Pinch Lever Adjusting Jig (Jig Ref. No. J-9) as shown in Fig. 6-2, taking care not to give scar on the Capstan.
 3. Hold the "A" portion of the Pinch Lever shown in Fig. 6-2 with finger and press the "A" portion until V-shaped ditch of the Pinch Lever contacts the semi-cylindrical portion of the Jig lightly. Check to see that two lamps of the Jig light simultaneously in this instance.

4. If not, loosen the two Allen type fixing screws, and adjust the Adjusting Screw so that the two lamps light at the same time.
5. After this adjustment, perform the sec. 6-6 Forward Mode Tape Run Adj.

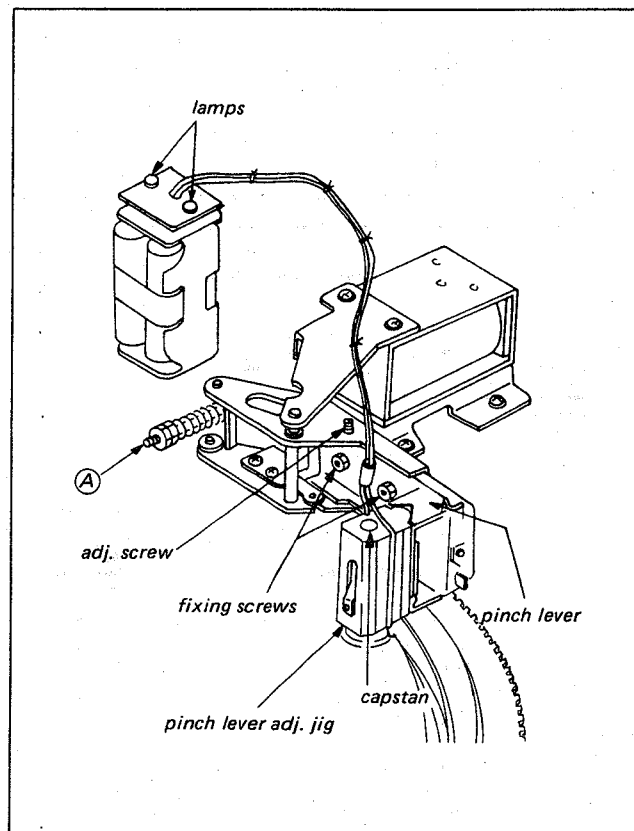
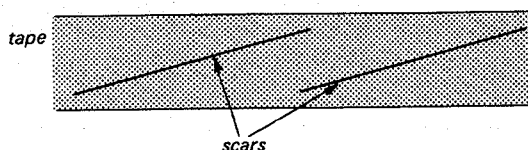


Fig. 6-2. Pinch lever right angle adj.
(EJECT and power OFF mode)

6-3. PINCH ROLLER SELF-ALIGNMENT ADJUSTMENT

- If the Pinch Roller Self-Alignment is poor, Pinch Roller's position and inclination against Capstan are erroneous so that tape will get scar, in the instance of Pinch Roller's pressing against Capstan.



1. Without threading tape, put the machine into the FWD mode.
2. Confirm that the positional relationship between the pinch roller arm (A) and arm (B) meet the required specification shown in Fig. 6-3. If not, adjust as follows.

3. Put the machine into the STOP mode once.
Loosen the screws holding the sub-ring stoppers (A) and (B).
Move the sub-ring stopper (A) toward ③ or ④ for the specification.
Move toward ③ Clearance ① becomes larger
Move toward ④ Clearance ② becomes larger
4. Put the machine into the FWD mode.
Confirm that the positional relationship between the pinch roller arm (A) and arm (B) meet the required spec. If the specification is satisfied, proceed with step 5. If not, perform step 3.
5. Install the sub-ring stopper (B) by pushing it slightly toward the sub-ring stopper (A).
6. Confirm the specification is satisfied when the FR-STOP is set up and then the FWD mode is set up again.

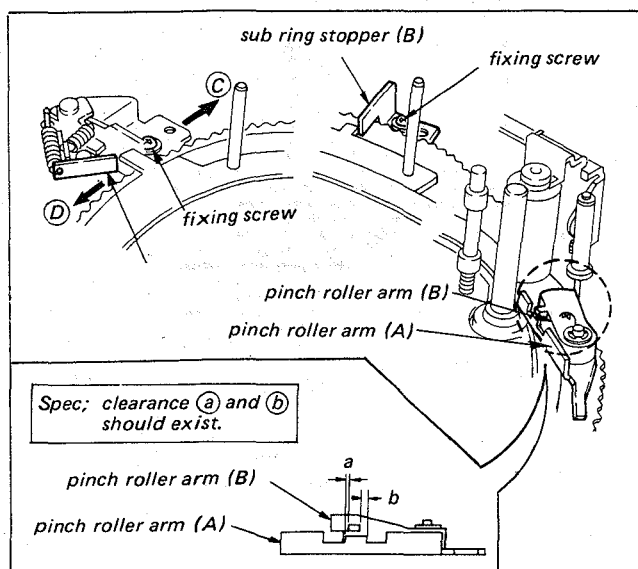


Fig. 6-3. Pinch roller self-alignment adj.
(FWD mode without tape)

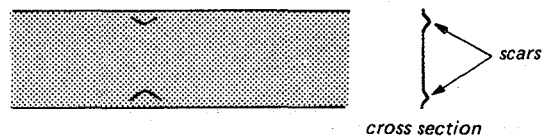
6-4. PINCH ROLLER SLANT ANGLE ADJUSTMENT

- If a Pinch Roller has incorrect slant angle, possible trouble is that a tape get scars diagonally across a tape. Shape of scar due to Pinch Roller of incorrect angle is a simple diagonal scars on tape or diagonal in opposite directions (shaped as $\wedge$) on tape. Another possible trouble due to incorrect slanting angle of a Pinch Roller is scars to be given in the top edge or bottom edge of the tape. These scars are resulted from curl of tape because a tape is strongly pressed against the top edge flange or bottom edge flange of the Tape Guide that locates near the Audio/CTL Head, during the period of tape threading.
- Important points of the tape damage confirmation are the following points.
 - (i) Tape curl given by the Tape Guide, during the period of tape threading.
 - (ii) Tape wrinkle given at around the Capstan Shaft, happening in the moment of just after the Pinch Roller pressing against the Capstan.

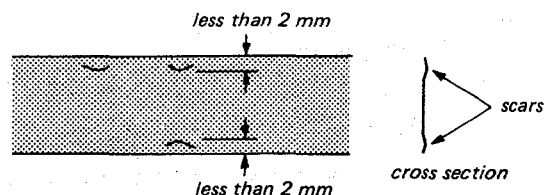
[Confirmation procedure]

- (1) Tape Curl given by the Tape Guide Flange, during the period of threading.
 - (i) Insert a KCA-60 type cassette. Wind the tape so that approximately equal amount of tape is wound onto both of the Take-up Reel-Table and Supply Reel-Table.
 - (ii) Press the FWD button to start threading and observe the tape run during threading at the Tape Guides (TG-IV, V) at both neighbours of the Audio/CTL head. Check to see that there exists no tape curl at top and bottom flanges of the Tape Guides (TG-IV, V). If there exists tape curl, it should be within the allowable limit in order to protect tape from tape curl. Allowable limit of tape curl is described in the following paragraphs.

- ① If tape curls at the flanges, and tape edge is strongly folded that results in scars, this tape curl is exceeding the allowable limit and requires adjustment.

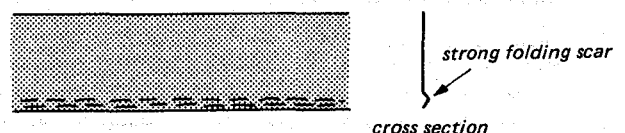


- ② Even though tape curls, the allowable limit of tape curl is described as shown. If tape curl is of small scale, not giving folding scar, the tape curl can be acceptable. (However, tape curl should not be continuous.)

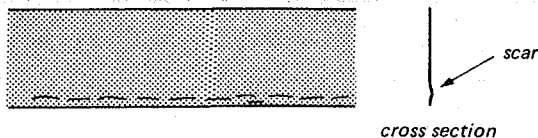


- (iii) Put the machine into STOP mode once. Press then the FWD button and observe the bottom flange of the Threading Roller so that tape is not producing curl at the bottom flange. Tape curl, if it exists, should be within the allowable limit that is described in the following paragraph.

- (1) If a strong folding scar is given on the tape edge, it is not acceptable.



- (2) If a scar is negligible as shown below, though tape curls, it is acceptable. (However, length of tape scar should be less than 50 mm).

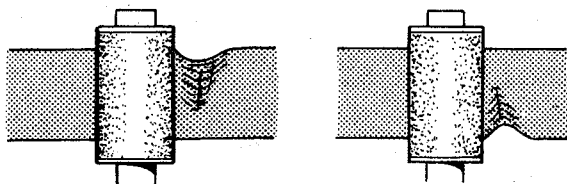


- (iv) Repeat PAUSE button ON and OFF. Check to see that there is no curl due to Tape Guide Flange. If curl exists, check if it is within allowable limit indicated by step (iii).
- (v) Repeat tape threading and unthreading between the FR-STOP position and threading completion, for 3 or 4 times. Repeat also the PAUSE button ON and OFF 3 or 4 times. Check tape curl.

If amount of tape curl is exceeding the allowable limit, adjust in accordance with the [Adjustment Procedure] that is described later.

- (2) Tape Wrinkle given at around the Capstan, happening in the moment of just after the Pinch Roller pressing against the Capstan.

- (i) Insert a KCA-60 type Cassette. Wind the tape so that approximately equal amount of tape is wound onto both of the Take-up and Supply Reel-Table.
- (ii) Press the FWD button to thread tape. Check to see that the tape wrinkle, that is given in the moment of the Pinch Roller's pressing against the Capstan, does disappear within two seconds. The tape wrinkle should be as shown below.



- (iii) Repeat the PAUSE button ON and OFF 3 ~ 4 times and check for tape wrinkle.

If tape wrinkle exceeds the allowable limit, proceed to the [Adjustment Procedure].

[Adjustment Procedure]

- This adjustment is very critical so that it should be initiated only when the tape curl and wrinkle exceed the allowable limit. This adjustment requires very careful and deliberate work.
- Sec. 5-1 Threading Back Tension Adjustment should be completed before initiating this adjustment.
- A replacement Pinch Roller (Fig. 6-4), to be supplied from SONY Repair Parts Center, is precisely adjusted before shipment from factory such as "slanting" etc so that any extra power should never be applied to a replacement Pinch Roller: After replacement of the Pinch Roller, the tape running system works satisfactorily without any adjustment after replacement.

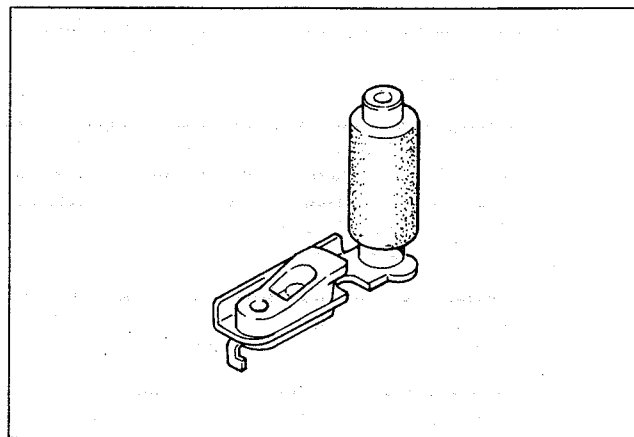


Fig. 6-4. Pinch roller unit

- Bend the "A" portion of the Pinch Roller Arm, shown in Fig. 6-6 until requirement of (1) "Tape Curl given by the Tape Guide Flange, during the period of Threading", and (2) "Tape Wrinkle given at around the Capstan", happening in the moment of just after the Pinch Roller pressing against the Capstan.

<Criteria of Bending the Pinch Roller Arm "A" portion>

- Insert a Cassette. Put the machine into FWD mode and press later the PAUSE button to put machine into PAUSE mode.
- Press the Pinch Lever lightly with finger in the direction shown by the arrow in Fig. 6-5 until the clearance between the Pinch Roller and the Capstan is 0.5mm.

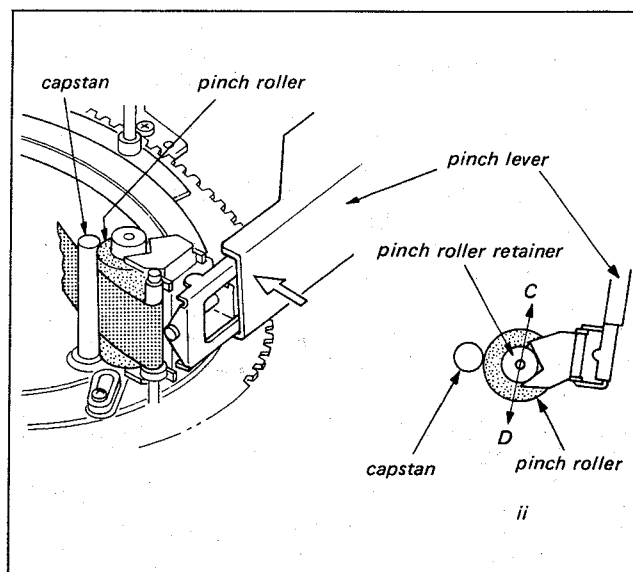


Fig. 6-5. Pinch roller slanting adj.
(PAUSE mode with cassette)

- Check to see that the clearances between the Capstan and the tape, at the tape top, and at the tape bottom are of equal amount, as observed by eye, visually. If they are not equal, adjust by bending the Pinch Lever's "A".

- (iv) Press further the Pinch Lever in the arrow direction until the Pinch Roller is on the verge of contacting the Capstan.
 - (v) Check to see that the Pinch Roller Retainer shown in Fig. 6-6 does not move in the "C" direction nor in the "D" direction during the course of foregoing step (vi), as observed by eye, visually. If the Pinch Roller Retainer should move, adjust by bending the Pinch Lever's A portion.
 - (vi) Repeat the foregoing steps (ii) through (v) until adjustment completes. Check for no tape curl during threading and effect of the PAUSE ON/OFF.
- However, the first priority of the adjustment is to remove tape curl and tape wrinkle during threading period and by PAUSE ON/OFF operation. Steps (i) through (vi) are mere criteria that are not necessarily satisfied if curl and wrinkle are removed.
- (vii) If tape curl cannot be removed by any means, replace the Pinch Roller with a new unit.

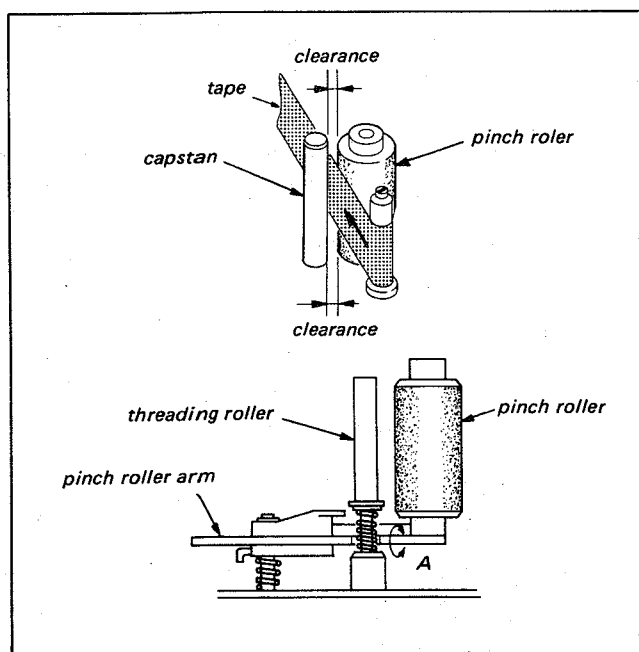


Fig. 6-6. Pinch roller slanting adj.
(PAUSE mode with cassette)

6-5. FAST FORWARD AND REWIND MODES TAPE RUN ADJ.

- Purpose of this adjustment is that the tape tension at the top edge and that at the bottom edge become equal as observing the tape at around the Threading Arm, during the F.FWD mode.
- This adjustment provides a reference of the tape run in the FWD mode too, around the Threading Arm. (When tape run in the F.FWD mode is adjusted, the FWD mode tape run adjustment is also required, accordingly.)
- If this adjustment is left incorrectly, unadjusted, possible trouble is that tape gets scar during FWD, F.FWD and unthreading modes.

1. Thread a KCA-60 or KC-60 type cassette tape and put the machine into the F.FWD mode at the tape top portion.
2. Observe the surface of the running tape very carefully at each point of the Threading Arm, the Drum and the Take-up Tension Regulator, as shown in Fig. 6-8. Check to see that amount of tape tension at the two points is exactly equal i.e. equal at the tape top and tape bottom. See Fig. 6-9. If not, adjust the Screw for Adjustment at the Threading Arm shown in Fig. 6-8.

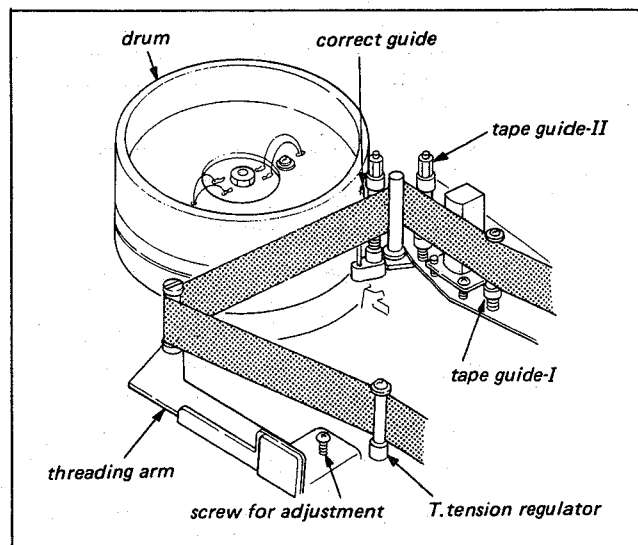


Fig. 6-8. F.FWD tape run adjustment
(F.FWD mode at the tape top portion)

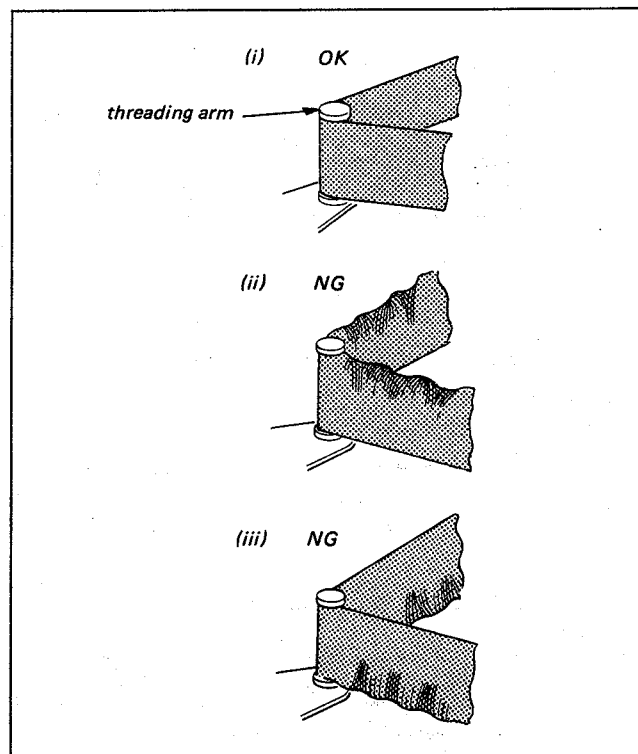


Fig. 6-9. F.FWD tape run adj.
(F.FWD mode at the tape top portion)

- If a tape curl is observed at the Flange of the Threading Arm, adjust height of the Threading Arm by re-setting the position of the Arm Adjustment Spacer, shown in Fig. 6-10.

Stop the machine. Loosen the Fixing Screw shown in Fig. 6-10. Adjust vertical position of the Spacer for Arm Adjustment, shown in Fig. 6-10.

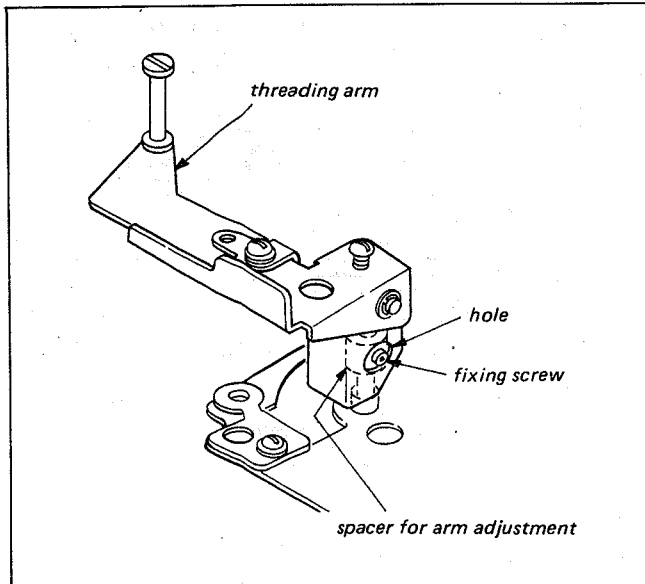


Fig. 6-10. F.FWD tape run adjustment (FR-STOP mode)

3. Put the machine into the REW mode.
4. Observe the running tape at the Tape Guide II at the Tape Guide III, shown in Fig. 6-11. Check to see tape runs without curl at Tape Guide II and Tape Guide III. If tape curls, bend bottom of correct guide shown in Fig. 6-11 with pliers.

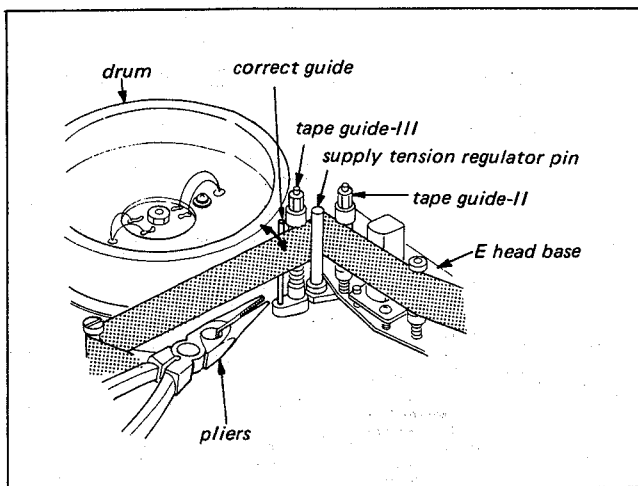


Fig. 6-11. Rewind tape run adj. (REW mode with tape)

5. Put the machine into the Forward mode. Check to see that the top of the correct guide pin does not contact the tape and drum. If it does, re-adjust the step 4.

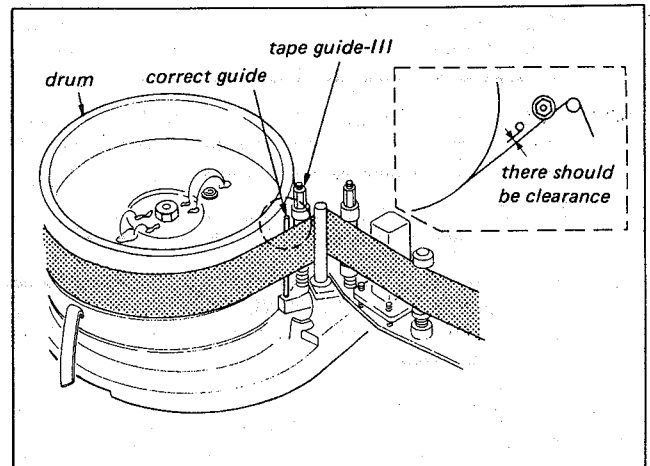


Fig. 6-12. Rewind tape run adj. (FWD mode with tape)

6-6. FORWARD MODE TAPE RUN ADJUSTMENT

- Purpose of this adjustment is that tape runs without curl to be caused by the Guide Flange, during threading and also that tape has equal tape tension at the top edge and bottom edge as observing at the Threading Arm while tape is running in the FWD mode.
 - This FWD mode tape run adjustment is required when the F.FWD mode tape run adjustment is attempted.
 - If a machine is left with incorrect FWD mode Tape Run, with increased Take-up reel-table's take-up torque, advancing tape in FWD mode can give scar on tape.
1. Thread a KCA-60 or KC-60 type cassette tape and put the machine into the FWD mode at the tape top portion.
 2. Observe the surface of the running tape shown in Fig. 6-13 very carefully at three points of the Upper Sub-ring Guide, the Threading Arm and the Take-up Tension Regulator. Check to see amount of tape tension is exactly equal at tape top and tape bottom.

If not, slightly loosen the fixing screw shown in Fig. 6-13, and adjust gently the Slantness Adj. Plate using an eccentric screwdriver (Jig Ref. No. J-5).

After adjustment, tighten the fixing screw.

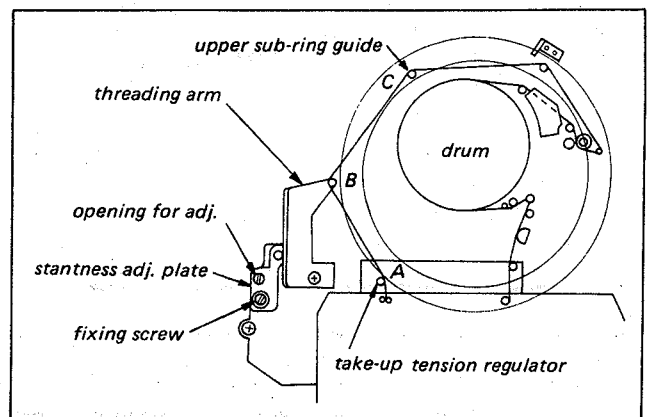


Fig. 6-13. FWD mode tape run adj. (FWD mode with tape)

3. While in the Forward mode, observe the bottom of the tape, at the Threading Roller so that tape runs in contact with the flange of the Threading Roller without curl.

If bottom of the tape is "not in contact" or is making "curl" at the flange of the Threading Roller, adjust the height of the Threading Roller as follows.

- i) Observe the clearance or curl between the bottom of the tape and the flange of the Threading Roller.
 - ii) Press the STOP button and let the Pinch Roller unthread. Turn the POWER SWITCH OFF in the moment when the Pinch Roller comes in front of the Audio Head.
 - iii) Loosen the fixing screw in the bottom of the Threading Roller, shown in Fig. 6-14 and adjust the Threading Roller Shaft for correct heightness in observing step (i). Tighten the fixing screw.
 - iv) Turn the POWER SWITCH ON. Put the machine into the Forward mode and check again the clearance or curl. If not, adjust the step (iii).
4. Press the STOP button to put the machine once into the FR-STOP mode, and press the FWD button to observe the tape motion during the threading.
 5. While threading the tape, check to see that the Tape Guide IV and V, shown in Fig. 6-14 are not causing any scar on tape.
 6. After finishing this adjustment, proceed to the Sec. 6-4 Pinch Roller Slant Angle adjustment.

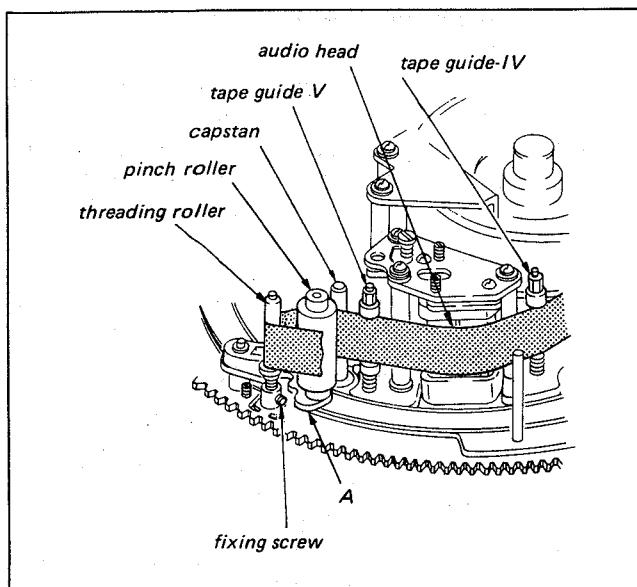


Fig. 6-14. FWD mode tape run adj. (FWD mode with tape)

6-7. TAPE ADVANCING POWER ADJUSTMENT

- If a machine has a lower tape advancing power than the required value, possible trouble is that the normal tape speed cannot be obtained in FWD mode. If an attempt is made to have too much higher Tape Advancing Power, mechanical load to the Capstan becomes exceeds load to cause adverse effect on the Capstan.
 - Creak sound are heard from the capstan shaft section in the FWD when the advancing power is low. If the creak sound become remarkable, the tape running stops, trace scratches are made on the tape or sometimes the tape is cut. Check the possible causes of the creaks in such cases.
1. Without inserting tape, put the machine into the FWD mode.
 2. Check to see that clearance (A) as shown in Fig. 6-15.
- If (A) clearance will not exist, proceed to the sec. 6-1.

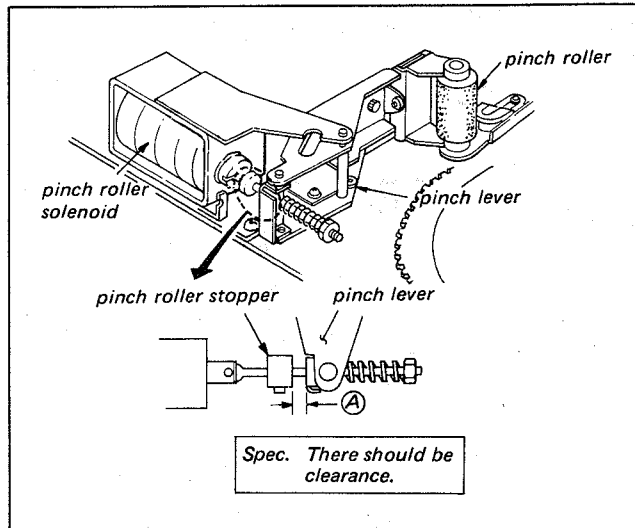


Fig. 6-15. Tape advancing power adj. (FWD mode without tape)

3. Prepare a Locally-Specially-Made-Tape referring Fig. 6-17. Hook a 1000 g full scale tension scale on an end of the specially-made-tape. Face the magnetic coating side toward the Capstan. While grasping the tension scale so as not to be pulled into the Capstan, insert the another end of the specially-made between the Pinch Roller and the Capstan and let the tape be pulled by the Capstan.
4. Pull the tension scale against the tape advancing power, gradually, until tape starts its slippage at the Capstan. Take the tension scale reading, that should be in between 700 g ~ 1100 g. If not, adjust the nut shown in Fig. 6-15.
5. After completion of adjustment, re-check the foregoing step 2.

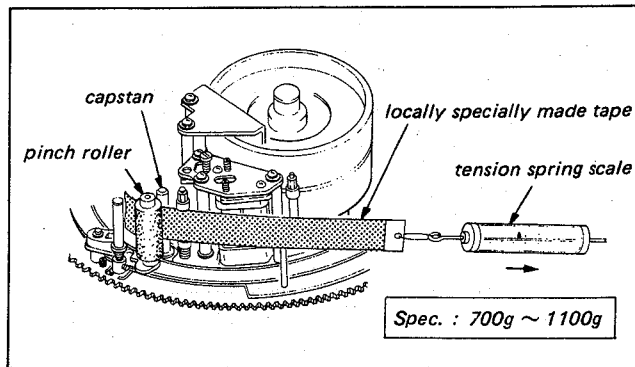


Fig. 6-16. Tape advancing power adjustment (FWD mode without tape)

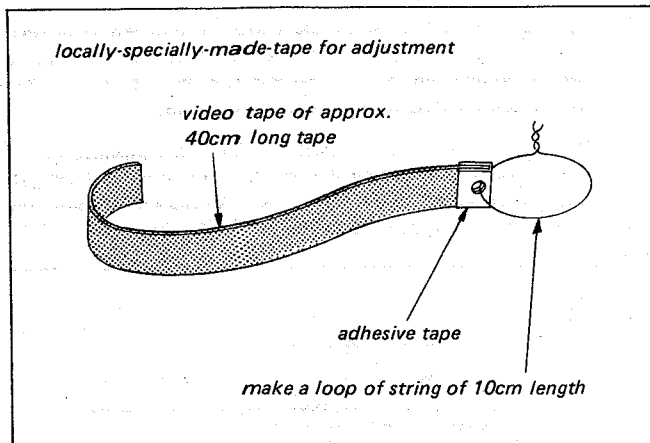
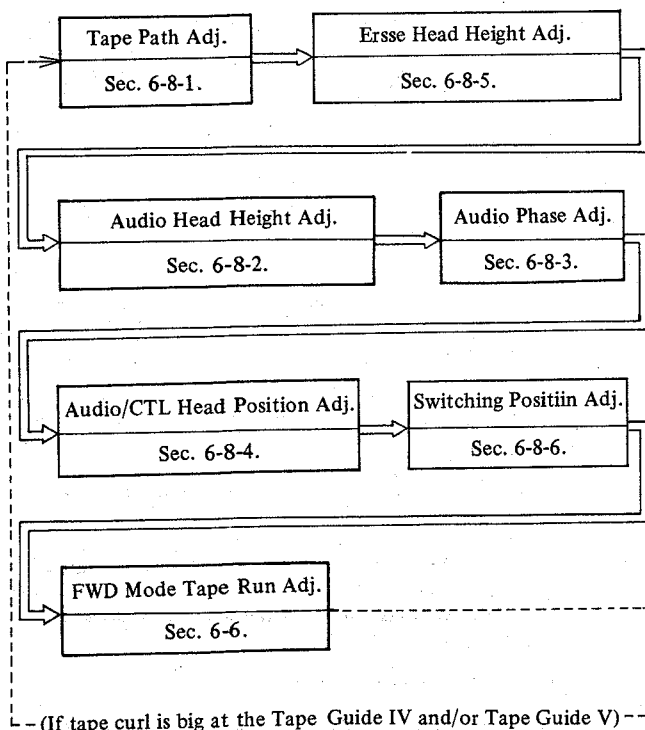


Fig. 6-17

- Disassemble a cassette. Cut a tape into 40cm long. Attach an adhesive tape to an end of the tape as shown in Fig. 6-17. Make a hole on the adhesive tape. Make a loop of 10cm long string through the hole. It is convenient in adjustment as any mark is written on the magnetic coating side of the tape, when cutting tape into 40cm long.

6-8. TRACKING ADJUSTMENT

The Tracking Adjustment is required to be performed in this sequence.



6-8-1. Tape Path Adj.

- This Tape Path Adjustment determines the tape interchangeability. Very deliverate adjustment and care are required throughout the course of Tape Path Adjustment.
- Connect scope to RP-2 board TP-15 externally triggered from TP-13. Set the SYSTEM SELECT SW to PAL/SECAM mode.
 - Playback the type RR5-1 PAL Alignment tape (Fig. Ref. No. J-21) monoscope signal portion.
 - As observing the waveform on scope, turn the TRACKING Control knob in both directions and check to see that amplitude of the RF waveform on scope increases/decreases with its envelope remains flat.
- If waveform envelope does not remain flat when the TRACKING Control is manipulated, adjust the Tape Guide II, the Tape Guide III, the Tape Guide IV, the Tape Guide V and the Supply Tension Regulator referring Fig. 6-20. However, do not adjust the S.Tension Regulator, as much as possible.
- Adjust the TRACKING Control for the maximum RF output signal amplitude.
 - Check that the RF signal envelope fluctuation of amplitude is within the specifications. If outside the specifications, adjust by means of step 3.

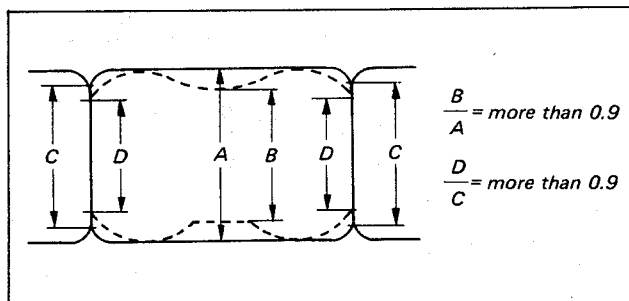


Fig. 6-18. Tape run adjustment (fluctuation of amplitude) (FWD mode, playing back RR5-1 PAL)

- Adjust the TRACKING Control for the maximum RF output.
- Check that the RF envelope is within the specifications of Fig. 6-19.

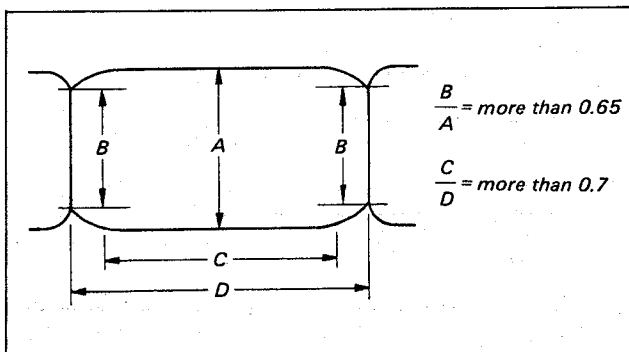


Fig. 6-19. Tape run adjustment (tape-to-head contact) (FWD mode, playing back RR5-1 PAL)

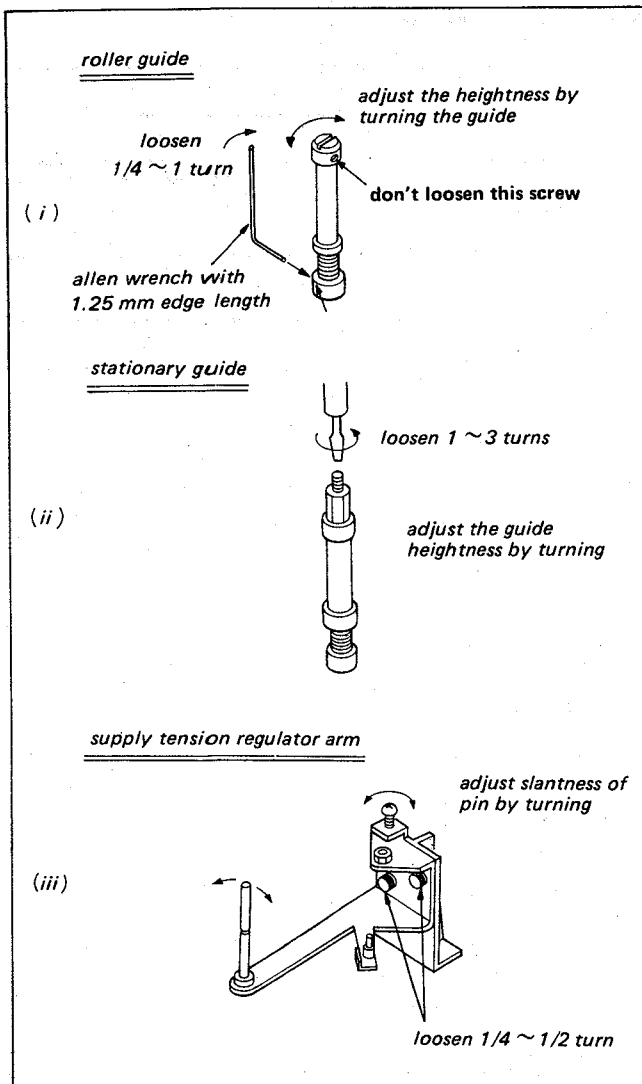


Fig. 6-20. Adjustment of tape guides

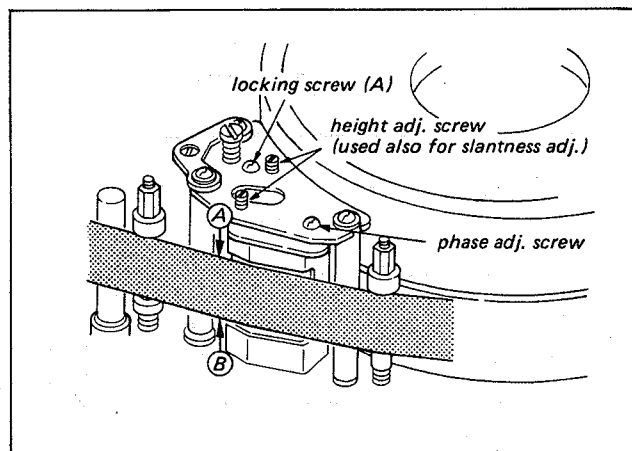
6-8-2. Audio Head Height Adj.

- If a machine has an incorrect Audio Head Height, the audio signal-to-noise ratio will be deteriorated when playing back a tape that is pre-recorded by any other recorder.
1. Connect the AC VTVM to the LINE OUT CH-1 connector. Set the SYSTEM SELECT SW to PAL/SECAM mode.
 2. Playback the Alignment tape RR5-1 PAL (Jig Ref. No. J-21) 1kHz portion.
 3. While playing back, observe the audio output level increase as the tape is lightly pressed down at (A) portion as shown in Fig. 6-21. The level increase should not be more than 0.5 dB.

If level increase is more than 0.5 dB when pressing down at (A), loosen the Locking Screw (A) and turn both Height Adj. Screws very small increment in (○) counter-clockwise until the level increase is within 0.5 dB increase. Tighten the Locking Screw.

Connect the AC VTVM to the CH-2 output. While playing back, observe the audio output level increase as the tape is lightly pushed up at the (B) portion in Fig. 6-21. The level increase should not be more than 0.5 dB.

If level increase is more than 0.5 dB when pushing up at (B), loosen the Locking Screw (A) and turn both Height Adj-Screws by small increment in (○) clockwise until the level increase is with 0.5 dB. Tighten the Locking Screw.

Fig. 6-21. Audio head height adj.
(FWD mode, playing back RR5-1 PAL)

6-8-3. Audio Azimuth/Phase Adj.

Prior to this Audio Phase Adjustment, sec. 6-8-2 Audio Head Height Adj. should have been finished already.

1. Connect the AC VTVM to the LINE OUT CH-1 connector. Set the SYSTEM SELECT SW to PAL/SECAM mode. Playback the 10kHz segment of Alignment Tape RR5-1 PAL (Jig Ref. No. J-21)
2. Loosen the locking screw (A). Adjust the phase adj. screw for maximum level and tighten the screw.
3. Playback the 1kHz segment of the Alignment tape RR5-1 PAL.
4. Connect CH-1/CH-2 LINE OUT connector to the horizontal and vertical inputs of the oscilloscope respectively so that a Lissajous figure appears on the scope. Adjust the scope for horizontal and vertical amplitudes of 6 cm. See Fig. 6-22.
5. Check that the vertical amplitude at the center in the horizontal direction is within 0.7 cm. See Fig. 6-22.

If it is not correct, loosen the head Locking Screw, shown in Fig. 6-22 and adjust the Phase Adjusting Screw for the correct value.

After the adjustment, re-tighten the head Locking Screw. Check the Lissajous figure after tightening the screw because sometimes tightening causes phase shift. If it is outside the specification, repeat the adjustment.

6. Playback the Alignment tape 10 kHz segment.
7. Check to see that the Lissajous waveshape is within 90deg.

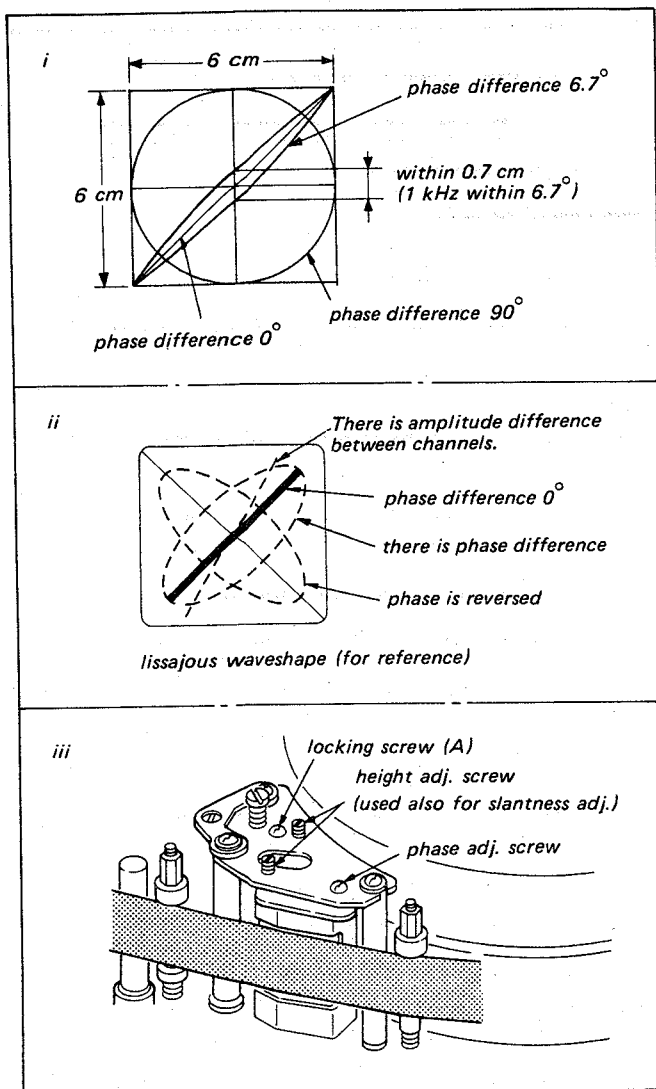


Fig. 6-22. Audio head phase adjustment (FWD mode, playing back RR5-1 PAL)

6-8-4. Audio/CTL Head Position Adj.

- If the AUDIO/CTL Head position is located other than the specified position, pre-recorded tape interchangeability among multiple machines will have trouble.
 - When either the Upper drum (with video heads), Head Drum Assembly or Audio/CTL Head is replaced, this adjustment is required to be executed.
 - Prior to this adjustment, the following adjustments should have been completed earlier.
 - sec. 6-8-1. Tape Path Adj.
 - sec. 6-8-2. Audio Head Height Adj.
 - sec. 6-8-3. Audio Head Phase Adj.
1. Connect scope; CH-1 to the RP-2 board TP-15 externally triggered from TP-13, ⊕ polarity, 2ms/sec of horiz. time base. Set the SYSTEM SELECT SW to PAL/SECAM mode.
 2. Set the TRACKING Control to its center (detent) position.

3. Playback the RR5-1 PAL Alignment tape (Jig Ref. No. J-21) monoscope portion.
4. Check to see that the TP-15 waveform has the maximum amplitude when the TRACKING Control is set in the mechanical center (detent) position.

If not, loosen the three locking screws and adjust the AUDIO/CTL Head position very small increment, using an eccentric screwdriver (Jig Ref. No. J-6) in the arrow direction.
5. Tighten the Locking Screw after adjustment.

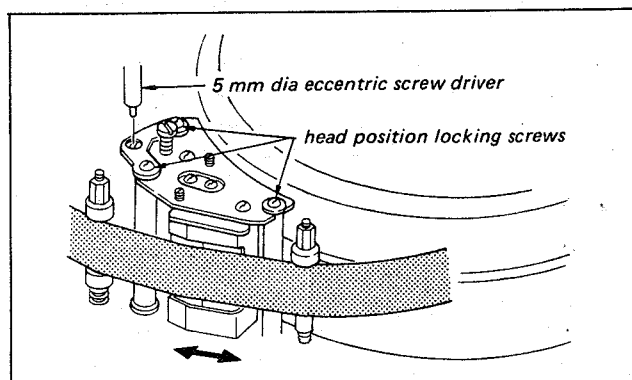


Fig. 6-23. Audio/CTL head position adj. (FWD mode, playing back RR5-1 PAL)

6-8-5. Full-Erase Head Height Adjustment

1. Playback the Alignment tape (RR5-1 PAL) (Jig. Ref. No. J-21). Check to see that Gap of the FULL-ERASE HEAD is visible above and beneath the tape top edge and bottom edge. If not, adjust as follows.
2. Loosen the securing screw (L) shown in Fig. 6-24. Turn the Height Adjusting Screws (A), (B) and (C) of exactly equal amount, in the same direction.

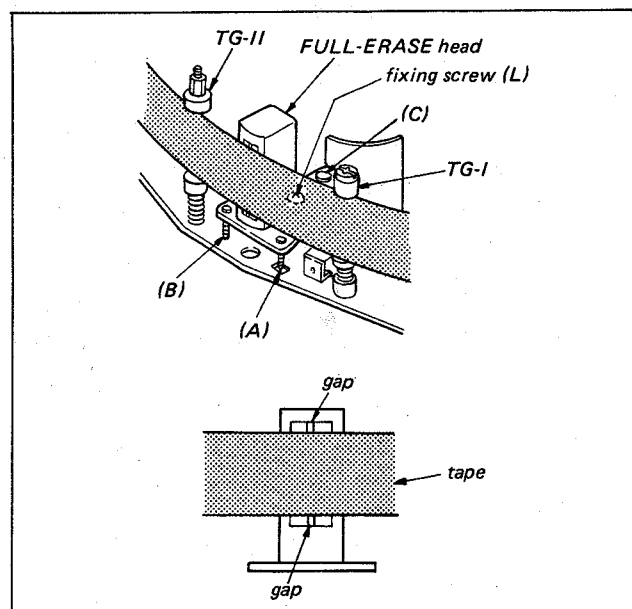


Fig. 6-24. Full erase head height adj. (alignment tape RR5-1 PAL playback mode)

- If the Gap of the FULL ERASE Head is not visible above top of the video tape, turn the screws (A), (B) and (C) in clockwise direction.

3. After adjustment is completed, tighten the securing screw (L) and check height again by step 1.

6-8-6. Switching Position Adjustment

(Check Procedure)

1. Connect the dual trace oscilloscope to TP-1/SV-10 board and VIDEO OUT connector, with trigger from TP-1/SV-10 board.
Set the SYSTEM SELECT SW to PAL/SECAM mode.
2. Play back the alignment tape (RR5-1 PAL) and set the TRACKING Control to its center (detent) position.
And confirm that the specification is satisfied.
If not, perform Step 4 for the adjustment.

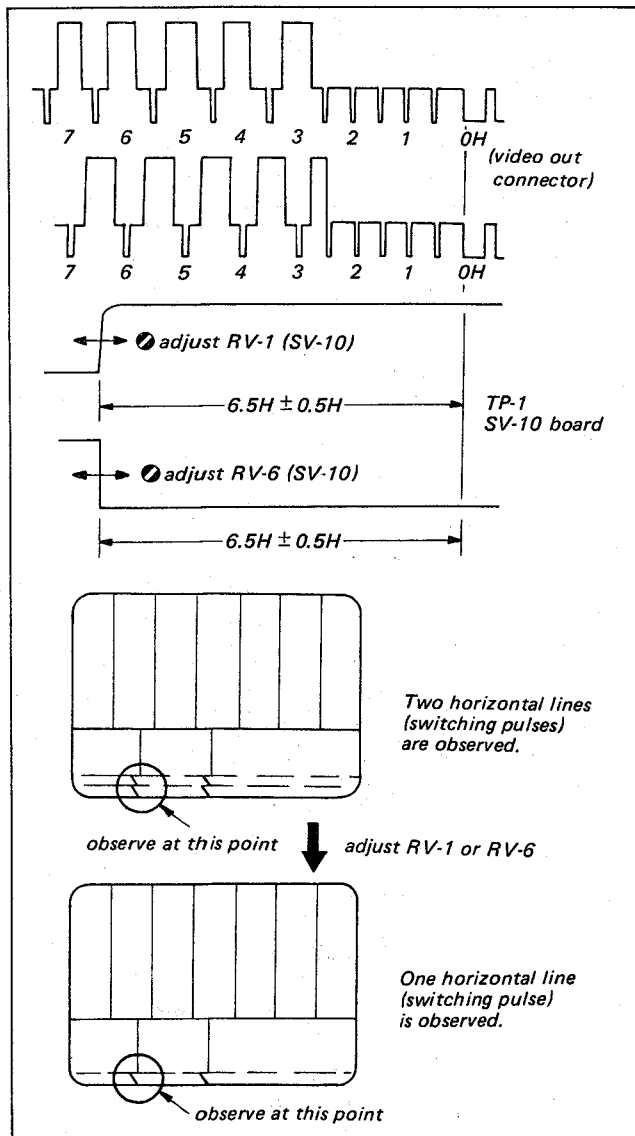


Fig. 6-25. Switching position adj.
(PLAY mode, playing back RR5-1 PAL)

3. Observe the monitor picture and confirm that the switching pulse shown in Fig. 6-25 are not two but only one observed at the lower section of the picture.

(The switching position adjustment is sufficient if the specification is satisfied in Step 2 but if adjustment is necessary perform Step 5.)

(Adjustment Procedure)

4. Adjust RV-1 and RV-6 on the SV-10 board shown in Fig. 6-25 for the specification.
5. Adjust RV-1 or RV-6 so that the switching position of the CH-A is identical with that of the CH-B.

6-9. TAPE SLACK DETECTOR ADJUSTMENT

- The Tape Slack Detecting system is composed of two micro switches. Purpose of this tape slack detector is to protect tape from damage when tape slackness at around the Capstan.

6-9-1. Pinch AUX. Plate Adjustment

- If the Pinch AUX plate is located in an incorrect position to have wider spacing than the specified (following) value, the Tape Slack Detector cannot detect tape slack because the Slack Detector's actuator is blocked by the Pinch Release Lever.
- If, oppositely, the spacing is narrower than the specified value, the Pinch Roller cannot be fully pressed against the Capstan so that tape speed will not be the rated tape speed.

1. Disconnect the EC-1 Board connector (CN341) by unplugging it. Put then the machine into the FWD mode by pressing the FWD button without inserting cassette.

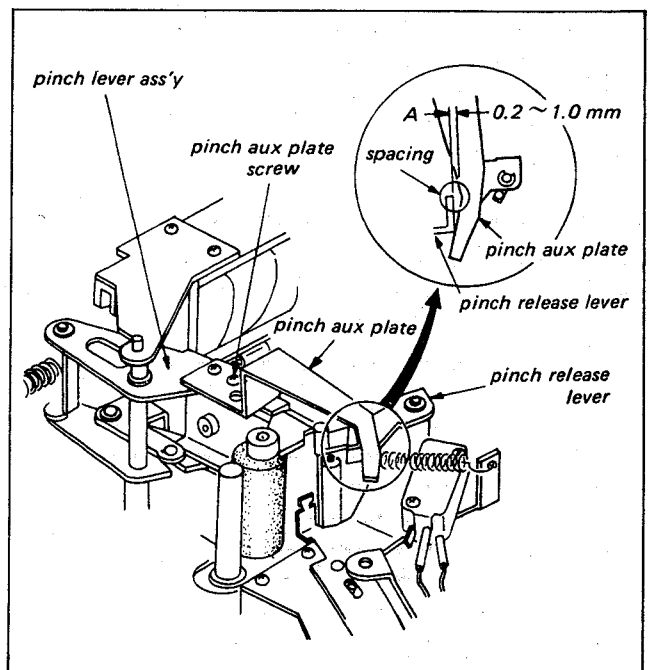


Fig. 6-26. Pinch aux plate position check
(FWD mode without tape)

2. Observe the Pinch Aux Plate shown in Fig. 6-26. Check to see that there is clearance of 0.2 ~ 1.0 mm between the Pinch Aux Plate and the Pinch Release Lever by inserting a thickness gauge in between. If the clearance is not 0.2 mm ~ 1.0 mm, loosen the Pinch Aux Plate securing screw and adjust its position for the specified clearance.

6-9-2. FWD Slack Switch Position Adj.

1. Disconnect the connector of the EC board.
2. Load the cassette and set-up the FWD mode.
3. Push the Actuator with finger in the direction shown by arrow in Fig. 6-27 until this switch is turned OFF. Listen to the micro switch click sound to make sure that it is turned OFF. (The Actuator should be able to move more than 2mm from this position.)
4. Start slowly to release the actuator until click sound is heard indicating that switch is turned ON.
5. Release finger from actuator and observe the actuator as it stops while in contact with tape. Make sure that the actuator travels more than 1mm (A) distance from the step 4 ON position until step 5 position.
6. If the step 5 requirement cannot be observed, loosen the two screws that secure micro switch (B) and adjust then the micro switch location.

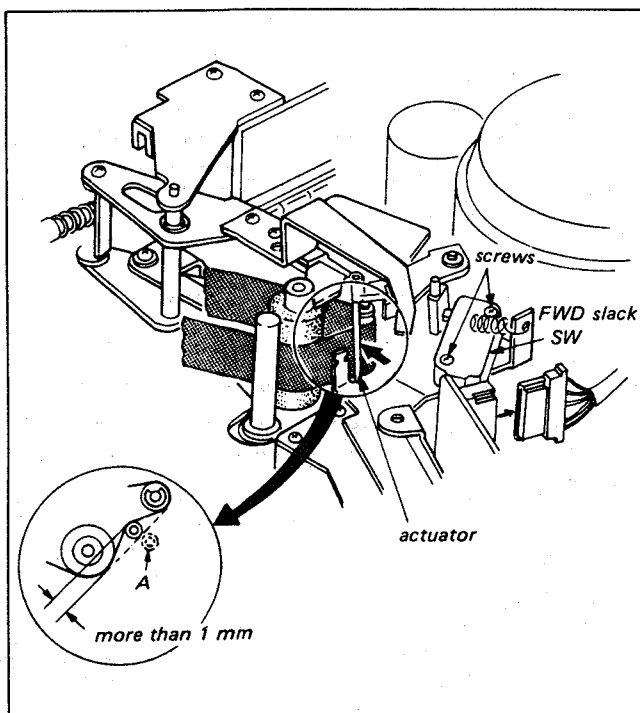


Fig. 6-27. FWD slack switch position adj. (FWD mode with tape)

6-9-3. Unthread Slack Switch Position Adj.

- This machine has three tape slack detecting devices. The first is the take-up reel rotation detecting device installed on the tape counter relay pulley that is detecting tape slack in the FWD (detection of the take-up reel table rotation). The second is the supply reel rotation detecting section installed beneath the supply reel table that is detecting tape slack in the REV (detection of supply reel table rotation). The third is the unthread-slack-switch that is to detect the tape tension in the unthreading.
 - The erroneous position of this switch allows that the threading ring starts unthreading even when the take-up reel happens to become defective and has no ability to wind the tape onto take-up reel table. The tape can be damaged as it is left inside mechanism.
1. Insert the cassette and set up the FWD mode.
 2. Push the actuator of the unthread slack switch with the finger in the direction indicated by the arrow in Fig. 6-28 until the switch is turned off. Confirm the turning-OFF by a click sound of the microswitch.
 3. Return the actuator gradually from that position and stop it when the microswitch is turned ON.
 4. Release the actuator from the finger at this position of step 3. Confirm that the moving distance of the actuator from the step 3 point to the point where it touches the tape to be stopped is within the specification shown in Fig. 6-28. If the specification is not satisfied, adjust the position of the unthread slack switch.
 5. Place the machine into the EJECT mode.
 6. Push the actuator of the unthread slack switch in the opposite direction against the arrow so as to turn ON the switch and return it gradually until the switch is turned off. Confirm that the clearance between the white plastic plate at the root of the actuator and the metal plate is more than 0.5mm. If it is not, adjust again the switch position so that this clearance specification and the specification in Step 4 are satisfied.

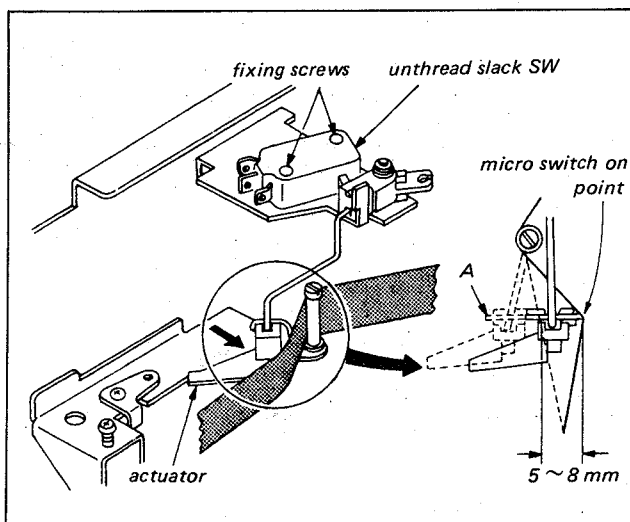


Fig. 6-28. Unthread slack switch adjustment (FWD mode with tape)

6-10. VIDEO HEAD DIHEDRAL ADJUSTMENT

- This adjustment is normally unnecessary, but is required only when an Upper Drum is replaced. (Replacement Upper Drum is precision-adjusted by micro-scope before shipment from factory.)
- Playback the Monoscope signal portion of the Alignment tape (RR5-1 PAL). Check to see that one vertical line beneath the switching point on the monitor screen looks divided into two separated lines which should normally be one line. (If one vertical line looks as two separate lines, dihedral adjustment is necessary. When one line is not divided into two lines, adjustment is not necessary.)
 - Put the machine into FR-STOP mode. Mount four pieces of Dihedral Adjusting Screws (Jig Ref. No. J-10) into the Upper Drum threaded holes. Turn the four Adjusting screws lightly.

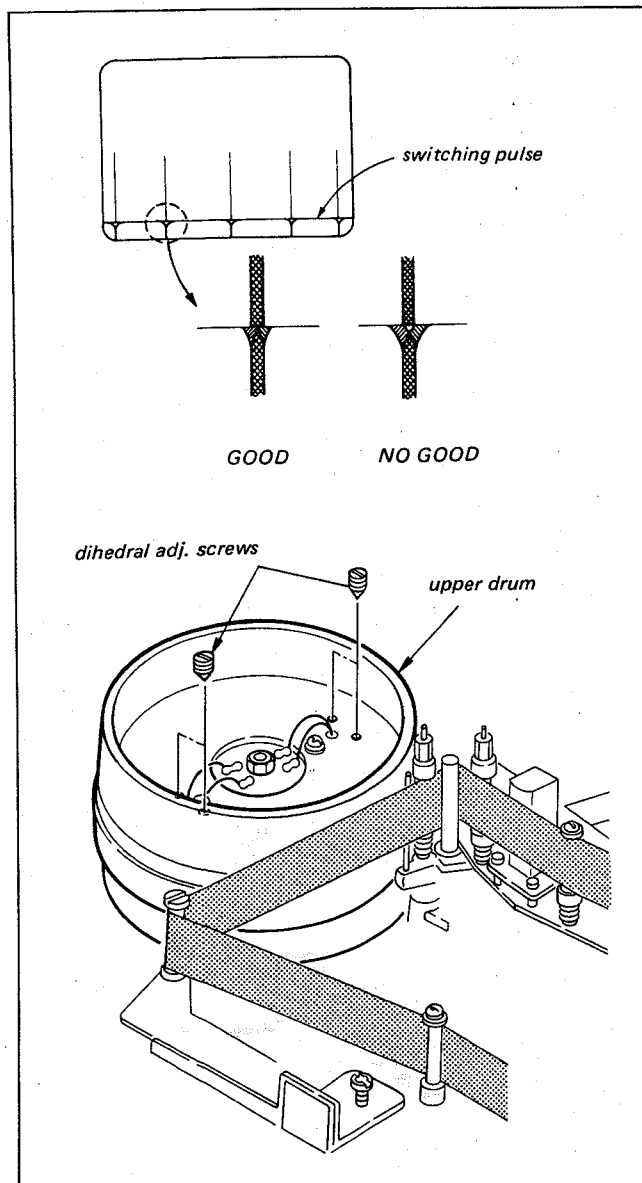


Fig. 6-29. Video head dihedral adj. (alignment tape RR5-1 PAL playback mode)

- Turn either one of the two Dihedral Adj. Screw that locates the video head with WHITE lead. Turn it further until some stiff feeling is felt. If this screw is turned further-more, Dihedral Adjustment is made, by moving the Video Head. So, turn this screw an additional quarter turn.
- Playback the Alignment Tape (RR5-1 PAL) with four screws installed on the Upper Drum. Check for dihedral distortion. If got worse, turn this screw counter-clockwise and turn then the neighbouring Dihedral Adj. Screw. Advance this screw a quater turn step, and check playback after each screwing. Adjust until dihedral error is removed.
- When adjustment is complete, remove the Dihedral Adj. screws. After removal, playback tape and check dihedral again. (Dihedral error re-appears sometimes after screws are removed.)

Note: When Dihedral Adj. screws are repeatedly tightened and loosened, the single screw that screws the Video Head piece can be loose.

6-11. TAPE SPEED ADJUSTMENT

- Power line frequency must be measured as reference data for the adjustment. Write down the measured value.

Reference: The allowable power line frequency for this machine is either 50 or 60 Hz $\pm 0.5\%$.
 60 Hz: 16.58 to 16.75 msec. } Measured on an electron-
 50 Hz: 19.90 to 20.10 msec. } ic counter-timer.

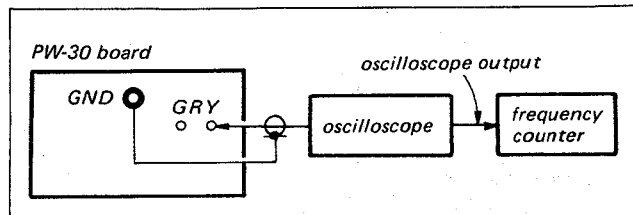


Fig. 6-30. Connections for power line frequency measurement

- Play back the audio 3 kHz segment of the alignment tape.
- Connect the scope to TP-102 on the AP-1A board and connect the frequency counter to the vertical output of the scope.
- Specification:** Differs depending upon the power line frequency and speed calibration values printed on the alignment tape label. Table 6-1 shows the tape speed specification along with the power line frequency at 0% calibration values. Calculate the mid-value of the tape speed specification using the speed calibration value printed on the alignment tape label.

Example: calibration value: -0.1%
 power line frequency: 16.63 msec (60 Hz $+ 0.2\%$)

$$3,006 \times \left(1 - \frac{-0.1}{100}\right) = 3,009$$

from Table 6-1

$\therefore$ Tape Speed Spec. = $3,009 \pm \frac{3}{9}$ Hz

5. **Adjustment:** If the speed is outside the specification, adjust as outlined below.
- (1) Clean the Capstan Belt and apply oil to the capstan bearing.
 - (2) If it is still outside the specification, replace the capstan belt with a new one.
 - (3) If the specified value is not obtained after Steps (1) and (2), replace the motor pulley as shown in Fig. 6-31. Kinds of pulleys and variations in tape speed due to the pulley replacement are shown in Table 6-2. Select a suitable pulley by considering the measured value of the tape speed and the mark on the pulley on the unit.
 - (4) Confirm that the tape speed is within the specified value following replacement.

Line Frequency		Tape Speed Specification (TP-102/AP-1A)
For 60 Hz	For 50 Hz	
16.58 msec	19.90 msec	3015 $\pm \frac{3}{9}$ Hz
16.60 msec	19.92 msec	3012 $\pm \frac{3}{9}$ Hz
16.62 msec	19.94 msec	3009 $\pm \frac{3}{9}$ Hz
16.63 msec	19.96 msec	3006 $\pm \frac{3}{9}$ Hz
16.65 msec	19.98 msec	3003 $\pm \frac{3}{9}$ Hz
Center 16.67 msec	20.00 msec	3000 $\pm \frac{3}{9}$ Hz
16.68 msec	20.02 msec	2997 $\pm \frac{3}{9}$ Hz
16.70 msec	20.04 msec	2994 $\pm \frac{3}{9}$ Hz
16.72 msec	20.06 msec	2992 $\pm \frac{3}{9}$ Hz
16.73 msec	20.08 msec	2988 $\pm \frac{3}{9}$ Hz
16.75 msec	20.10 msec	2985 $\pm \frac{3}{9}$ Hz

Table 6-1. Tape speed specification (TP-102/AP-1A)

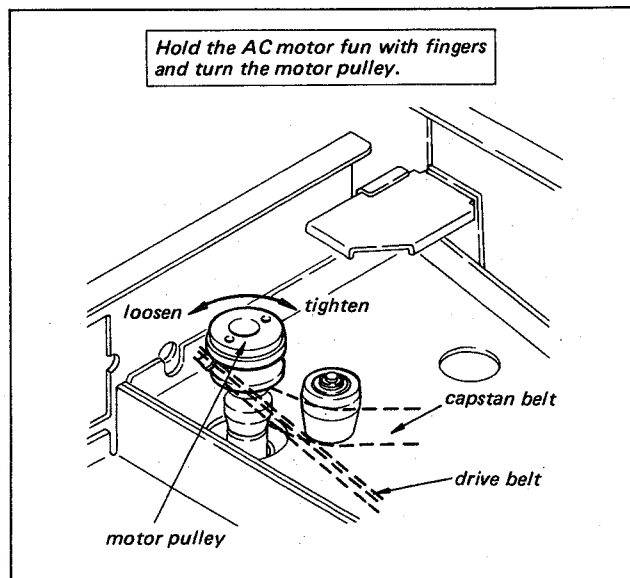


Fig. 6-31. Replacement of motor pulley

60 Hz Pulley		50 Hz Pulley	
Part Code No.	Free Speed variation (TP-102/ AP-1A)	Part Code No.	Free Speed variation (TP-102/ AP-1A)
3-649-261-72	4.34 Hz	3-649-262-71	4.55 Hz
3-649-261-82	4.34 Hz	3-649-262-81	4.55 Hz
3-649-261-92	4.34 Hz	3-649-262-91	4.55 Hz
3-649-261-02	4.34 Hz	3-649-262-02	4.55 Hz
3-649-261-12	4.34 Hz	3-649-262-12	4.55 Hz
3-649-261-22	4.34 Hz	3-649-262-22	4.55 Hz
3-649-261-32	4.34 Hz	3-649-262-32	4.55 Hz
3-649-261-42	4.34 Hz	3-649-262-42	4.55 Hz
3-649-261-52	4.34 Hz	3-649-262-52	4.55 Hz
3-649-261-62	4.34 Hz	3-649-262-62	4.55 Hz

Mark

Mark

Frequency at TP-102 (AP-1A) increases.

Table 6-2. Motor pulleys and tape speed variation

SECTION 7 POWER SUPPLY ALIGNMENT

[Equipment Required]

DC Voltmeter

7-1. REG 12V ADJUSTMENT

machine condition for adjustment	spec.	adjustment
<i>Playback mode</i>	<i>TP-2/PW-30</i> <i>12.0V ±0.2V DC</i>	 <i>R16/PW-30 board</i>

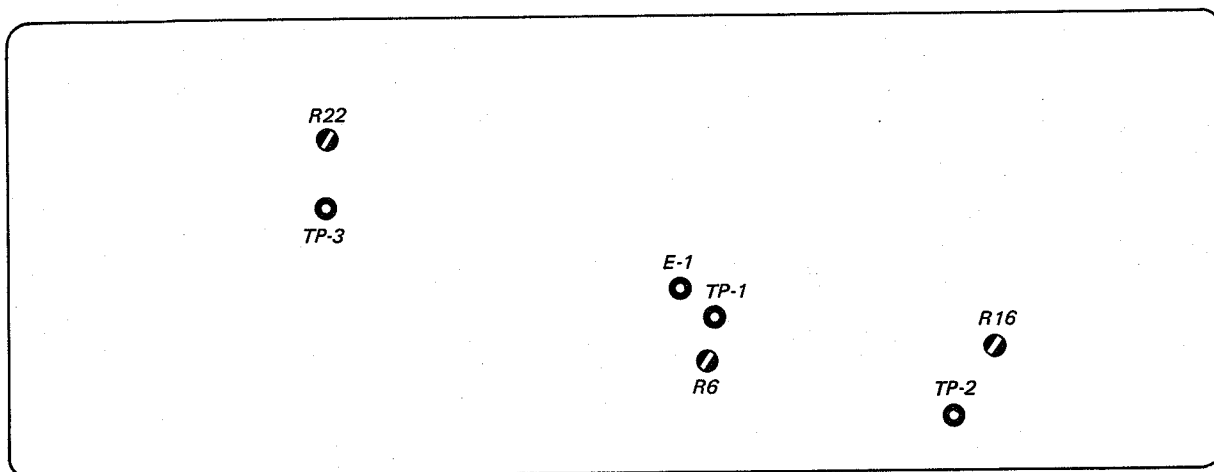
Note: If the REG 12V adjustment is attempted, re-alignment of the video system and servo system are required.
Do not attempt adjustment to the REG 12V power supply unless machine performance is obviously poor due to incorrect power supply voltage. If adjustments are made to the power supply, re-alignment of the video and servo systems is necessary.

7-2. REG 24V ADJUSTMENT

machine condition for adjustment	spec.	adjustment
<i>Playback mode</i>	<i>TP-1/PW-30</i> <i>24.0 ±0.2V DC</i>	 <i>R6/PW-30 board</i>

7-2. REG 6.8V ADJUSTMENT

machine condition for adjustment	spec.	adjustment
<i>Playback mode</i>	<i>TP-3/PW-30</i> <i>6.8V ±0.1V DC</i>	 <i>R22/PW-30 board</i>



PW-30 board

SECTION 8

SERVO SYSTEM ALIGNMENT

[Equipment Required]

Alignment Tape; RR5-1S PAL (SONY Parts No. 8-960-015-61)
 RR4-7S SECAM (SONY Parts No. 8-960-014-87)
 RR5-1S NTSC (SONY Parts No. 8-960-015-01)

Contents of RR5-1S PAL and RR5-1S NTSC

Tape Counter	Video Track	Audio Track
000 - 137	Monoscope	3kHz, 0dB
137 - 249	Colour bar (75%)	3kHz, 0dB
249 - 346	RF sweep	3kHz, 0dB
346 - 390	No signal	1kHz, 0dB
390 - 432	No signal	10kHz, -10dB

Contents of RR4-7S SECAM

Tape Counter	Video Track	Audio Track
000 - 346	Colour bar (75%)	No signal

Blank Tape; KCA-60 or KCS-20 (SONY standard products)
 Oscilloscope, dual trace

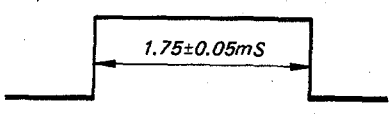
[Mechanical Parts Cleaning]

Clean the tape running system and drive system, referring Section 2.

8-1. TAPE SPEED ADJUSTMENT

Refer to the Section 6-11.

8-2. V BLANKING PULSE WIDTH ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
- SYSTEM SELECT SW; PAL/SECAM - Playback mode; RR5-1S PAL or RR4-7S SECAM	TP-2/SV-10 	RV2/SV-10 board

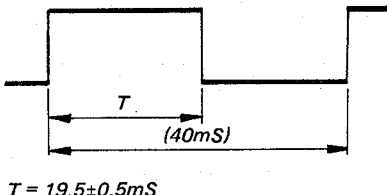
8-3. DRUM FREE SPEED ADJUSTMENT (PAL/SECAM)

machine conditions for adjustment	spec.	adjustment
- SYSTEM SELECT SW; PAL/SECAM - Playback mode; RR5-1S PAL or RR4-7S SECAM	TP-18/SV-10 $6.3 \pm 0.1 \text{ V DC}$	RV5/SV-10 board

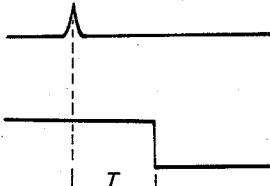
8-4. DRUM FREE SPEED ADJUSTMENT (NTSC)

machine conditions for adjustment	spec.	adjustment
• SYSTEM SELECT SW; NTSC • Playback mode; RR5-1S NTSC	TP-18/SV-10 $7.0 \pm 0.1 \text{ V DC}$	RV4/SV-10 board

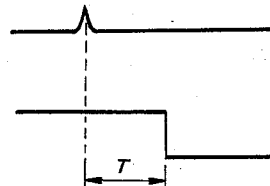
8-5. TRACKING CONTROL VARIABLE RANGE CALIBRATION

machine conditions for adjustment	spec.	adjustment
• SYSTEM SELECT SW; PAL/SECAM • TRACKING CONTROL; detent position • Playback mode; RR5-1S PAL or RR4-7S SECAM	TP-7/SV-10  $T = 19.5 \pm 0.5 \text{ mS}$	RV9/SV-10 board

8-6. TRACKING CONTROL CALIBRATION (PAL/SECAM)

machine conditions for adjustment	spec.	adjustment
• SYSTEM SELECT SW; PAL/SECAM • TRACKING CONTROL; detent position • Playback mode; RR5-1S PAL or RR4-7S SECAM	TP-14/SV-10 CHOP mode TP-8/SV-10  $T = 1.5 \pm 0.5 \text{ mS}$	RV7/SV-10 board EXT. TRIG; TP-1/SV-10

8-7. TRACKING CONTROL CALIBRATION (NTSC)

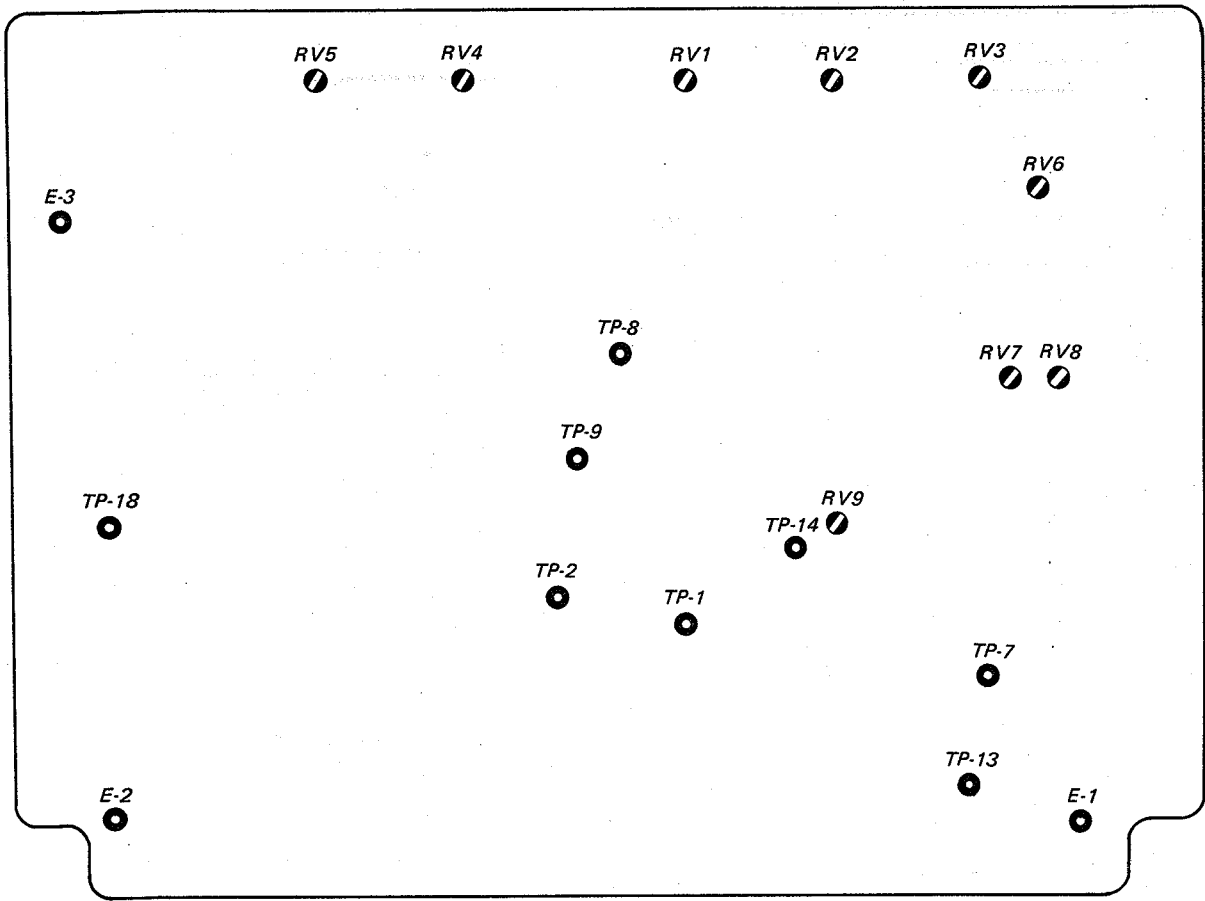
machine conditions for adjustment	spec.	adjustment
• SYSTEM SELECT SW; NTSC • TRACKING CONTROL; detent position • Playback mode; RR5-1S NTSC	TP-14/SV-10 CHOP mode TP-8/SV-10  $T = 1.5 \pm 0.5 \text{ mS}$	RV8/SV-10 board EXT. TRIG; TP-1/SV-10

8-8. SWITCHING POSITION ADJUSTMENT

machine conditions for adjustment	spec. & adjustment
• SYSTEM SELECT SW; PAL/SECAM • Playback mode; RR5-1S PAL or RR4-7S SECAM	TP-21/DM-8 CHOP mode TP-1/SV-10 6.5±0.5H RV1/SV-10 board RV6/SV-10 board EXT. TRIG; TP-1/SV-10

8-9. DRUM LOCK PHASE ADJUSTMENT

machine conditions for adjustment	spec. & adjustment
• SYSTEM SELECT SW; PAL/SECAM • VIDEO IN; PAL or SECAM video signal • Record mode	TP-13/SV-10 CHOP mode TP-1/SV-10 6.5±0.5H RV3/SV-10 board EXT. TRIG; TP-1/SV-10



SV-10 board

SECTION 9

AUDIO SYSTEM ALIGNMENT

[Equipment Required]

Alignment Tape; RR5-1S PAL (SONY Parts No. 8-960-015-61)

Contents of RR5-1S PAL

Tape Counter	Video Track	Audio Track
000 – 137	Monoscope	3kHz, 0dB
137 – 249	Colour bar (75%)	3kHz, 0dB
249 – 346	RF sweep	3kHz, 0dB
346 – 390	No signal	1kHz, 0dB
390 – 432	No signal	10kHz, -10dB

Blank Tape; KCA-60 or KCS-20 (SONY standard products)

Audio Oscillator

Audio Attenuator

VTVM

Oscilloscope, dual trace

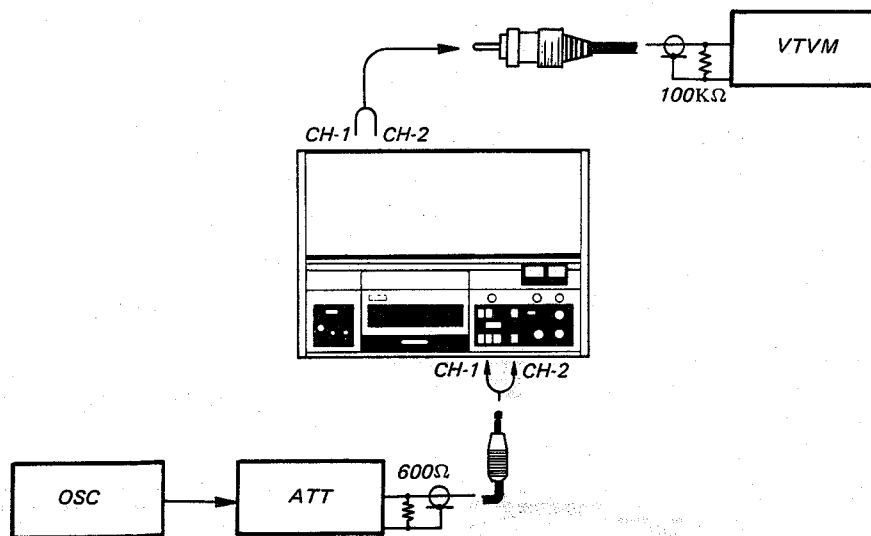
Frequency Counter

[Cleaning]

Clean the head, drum, and tape paths such as tape guides with a chamois dampened with methanol.

[Head degaussing]

Demagnetize the heads with the head demagnetizer.



9-1. AUDIO HEAD HEIGHT ADJUSTMENT

Refer to the Section 6-8-2.

9-2. AUDIO AZIMUTH/PHASE ADJUSTMENT

Refer to the Section 6-8-3.

9-3. AUDIO/CTL HEAD POSITION ADJUSTMENT

Refer to the Section 6-8-4.

9-4. PLAYBACK LEVEL ADJUSTMENT

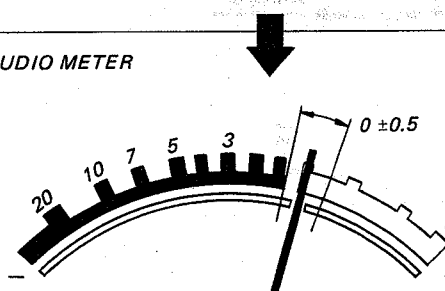
machine conditions for adjustment	spec.	adjustment
- SYSTEM SELECT SW; PAL/SECAM - Playback mode; RR5-1S PAL (1kHz segment)	LINE OUT (terminated) $-5 \pm 0.5 \text{ dB}$	- R112/AP-1 (CH-1/L) - R212/AP-1 (CH-2/R)

9-5. PLAYBACK FREQUENCY RESPONSE ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
- SYSTEM SELECT SW; PAL/SECAM - Playback mode; RR5-1S PAL (1kHz/10kHz segment)	LINE OUT (terminated) [10kHz PB Level] = [1kHz PB Level] $-10 \pm 1.5 \text{ dB}$ NOTE; Alignment tape 10kHz is recorded at -10 dB level.	- R109/AP-1 (CH-1/L) - R209/AP-1 (CH-2/R)

Repeat sec. 9-4 PB Level and sec. 9-5 PB Freq. Resp. adj. alternately.

9-6 "AUDIO LEVEL" CONTROL SETTING/METER CALIBRATION

machine conditions for adjustment	spec.	adjustment
- LIMITER SW; OFF - INPUT SELECT SW; LINE - MIC IN; 1kHz, -60 dB - E-E mode	LINE OUT (terminated) $-5 \pm 0.5 \text{ dB}$	- AUDIO LEVEL Control knob (CH-1) - AUDIO LEVEL Control knob (CH-2)
	AUDIO METER 	- R121/AR-2 board (CH-1/L) - R221/AR-2 board (CH-2/R) Note; The AUDIO LEVEL control should not be touched until rest of sec. 9 AUDIO SYSTEM Alignment are completed.

9-7. AUDIO LIMITER ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
- LIMITER SW; ON - INPUT SELECT SW; LINE - MIC IN; 1kHz -30dB - E-E mode	LINE OUT (terminated) $-2.0 \pm 0.5\text{dB}$	Ⓐ R119/AR-2 board (CH-1/L) Ⓐ R219/AR-2 board (CH-2/R)

9-8. BIAS FREQUENCY ADJUSTMENT (REC)

machine conditions for adjustment	spec.	adjustment
Record mode	TP-1/AR-2 $70 \pm 3\text{kHz}$	Ⓐ L3/AR-2 board

9-9. BIAS FREQUENCY ADJUSTMENT (DUB)

machine conditions for adjustment	spec.	adjustment
AUDIO DUB mode	TP-1/AR-2 Same frequency as that in RECORD mode $\pm 1\text{kHz}$	Ⓐ L2/AR-2 board

9-10. OVERALL FREQUENCY RESPONSE ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
- LIMITER SW; OFF - INPUT SELECT SW; LINE - MIC IN; 1kHz/10kHz; -80dB - Record/Playback mode	LINE OUT (terminated) $\left(\begin{matrix} 10\text{kHz} \\ \text{Record/Playback} \\ \text{level} \end{matrix} \right) = \left(\begin{matrix} 1\text{kHz} \\ \text{Record/Playback} \\ \text{level} \end{matrix} \right) \pm 1.0\text{dB}$	Ⓐ C10/AR-2 board (CH-1/L) Ⓐ C11/AR-2 board (CH-2/R) Increasing the BIAS voltage by 3.5V (rms) (measured at TP-2/AR-2 for CH-1, TP-3/AR-2 for CH-2) corresponds to the decrease of 1dB of the 10kHz Record/Playback level. Adjust the BIAS CURRENT until the above spec is fulfilled.

9-11. BIAS TRAP ADJUSTMENT (REC)

machine conditions for adjustment	spec.	adjustment
- both MIC IN & LINE IN; No signal should be fed. - Record mode	TP-101/AR-2 (CH-1/L) TP-201/AR-2 (CH-2/R) Adjust for minimum signal amplitude (i.e. bias leaking)	Ⓐ L102/AR-2 board (CH-1/L) Ⓐ L202/AR-2 board (CH-2/R)

9-12. BIAS TRAP ADJUSTMENT (AUDIO DUB)

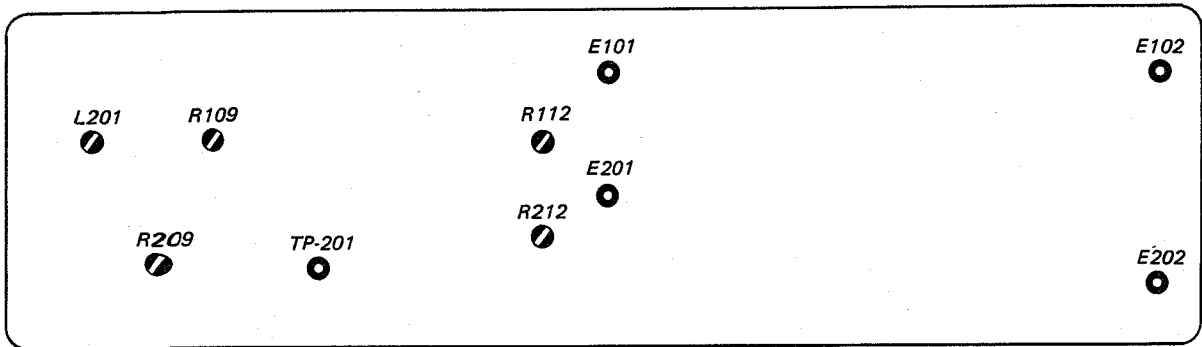
machine conditions for adjustment	spec.	adjustment
• both MIC IN & LINE IN: No signal should be fed. • AUDIO DUB mode	TP-201/AP-1 Adjust for minimum signal amplitude (i.e. bias leaking)	⊗ L201/AP-1 board

9-13. RECORD LEVEL ADJUSTMENT

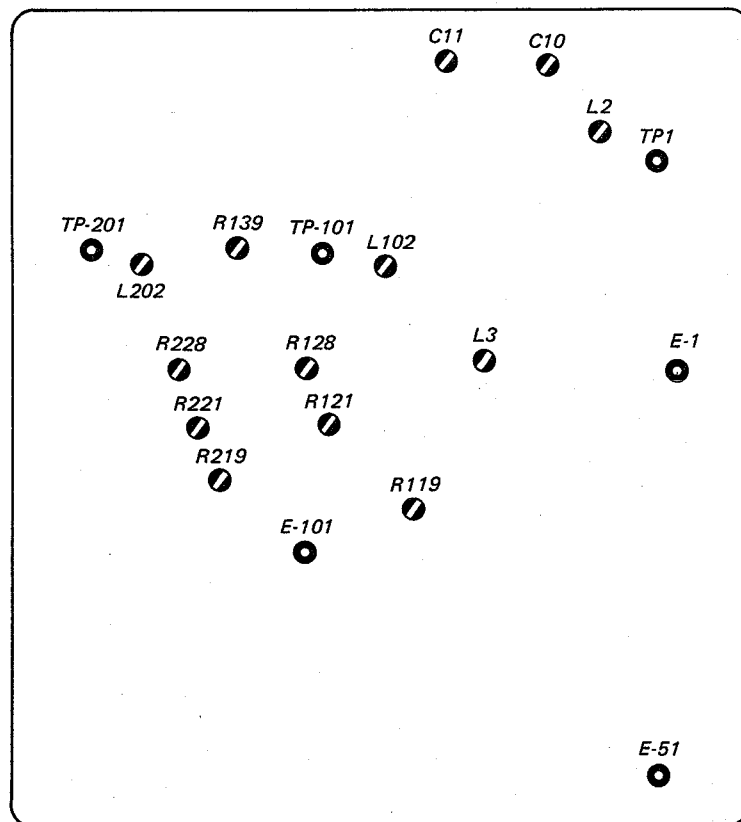
machine conditions for adjustment	spec.	adjustment
• LIMITER SW; OFF • INPUT SELECT SW; LINE • MIC IN; 1kHz, -60dB • Record/Playback mode	LINE OUT (terminated) The self Record/Playback level should be -5.0 ±1.0dB (The level difference between ch-1 & ch-2 should be less than 1 dB.) If adjustment is found to be necessary, increase or decrease the E-E signal level at TP-101/AR-2 (CH-1) or TP-201/AR-2 (CH-2) during E-E mode, by the same signal level as is found to be adjusted in the self Record/Playback procedure.	⊗ R128/AR-2 board (CH-1/L) ⊗ R228/AR-2 board (CH-2/R)

9-14. CROSS-TALK CANCEL ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• LIMITER SW; OFF • INPUT SELECT SW; LINE • MIC IN (CH-1); 5kHz, -60dB • AUDIO DUB mode; Tape; Video channel; prerecorded Audio channel; no signal recorded	LINE OUT (CH-2/R) Adjust for minimum signal amplitude (i.e. cross-talk)	⊗ R139/AR-2 board



AP-1 board



AR-2 board

SECTION 10 VIDEO SYSTEM ALIGNMENT

[Equipment Required]

Alignment Tape; RR5-1S PAL (SONY Parts No. 8-960-015-61)
RR4-7S SECAM (SONY Parts No. 8-960-014-87)

Contents of RR5-1S PAL and RR5-1S NTSC

Tape Counter	Video Track	Audio Track
000 - 137	Monoscope	3kHz, 0dB
137 - 249	Colour bar (75%)	3kHz, 0dB
249 - 346	RF sweep	3kHz, 0dB
346 - 390	No signal	1kHz, 0dB
390 - 432	No signal	10kHz, -10dB

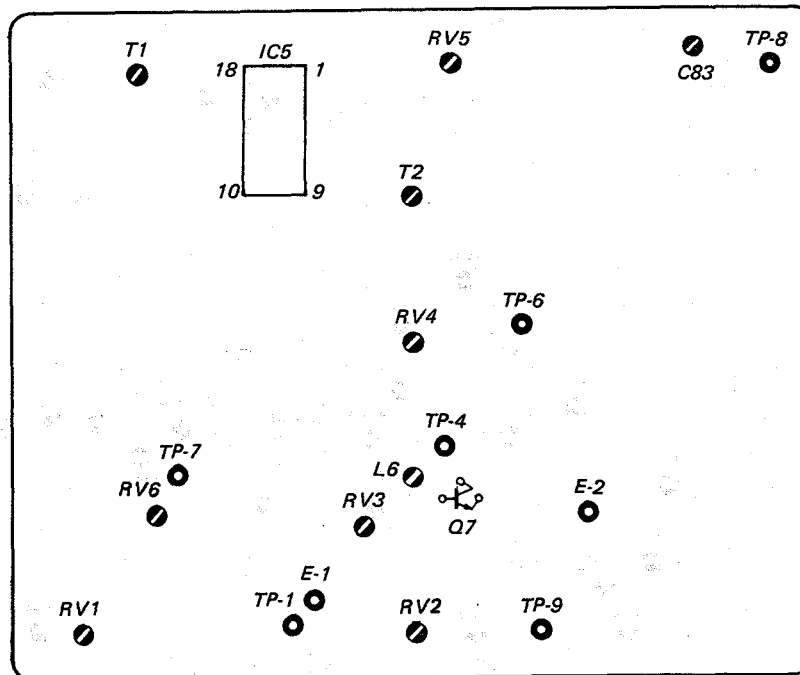
Contents of RR4-7S SECAM

Tape Counter	Video Track	Audio Track
000 - 346	Colour bar (75%)	No signal

Blank Tape; KCA-60 or KCS-20 (SONY standard products)
Oscilloscope, dual trace
Frequency Counter
PAL Colour Monitor
(Video Sweep Generator)

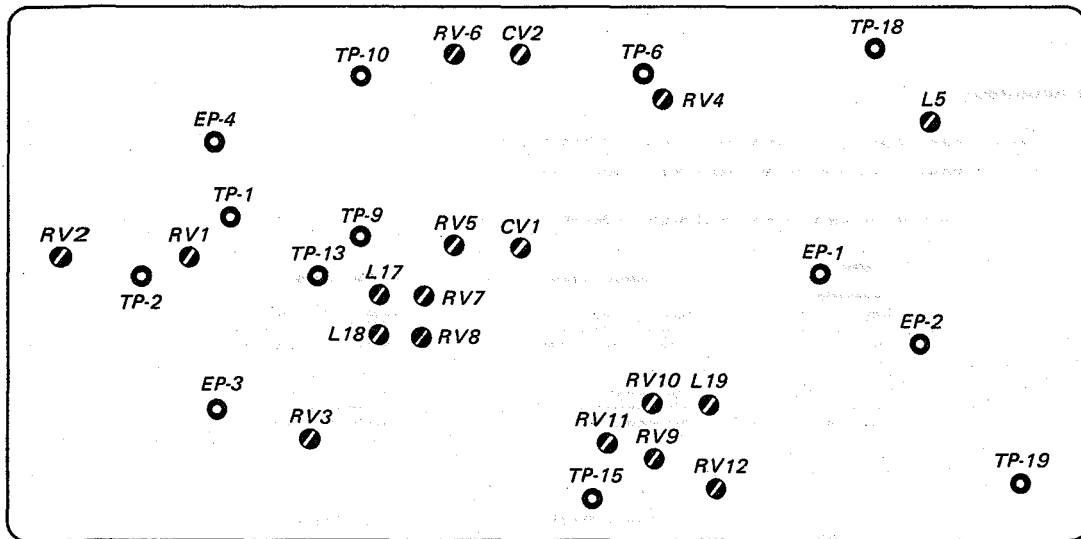
Note; The following delay lines are factory adjusted and does not need to adjust on regular service.
When these delay lines replaced, select the same tap of former one.

DL2/MD-5 board
DL1/DM-8 board
DL3/DM-8 board

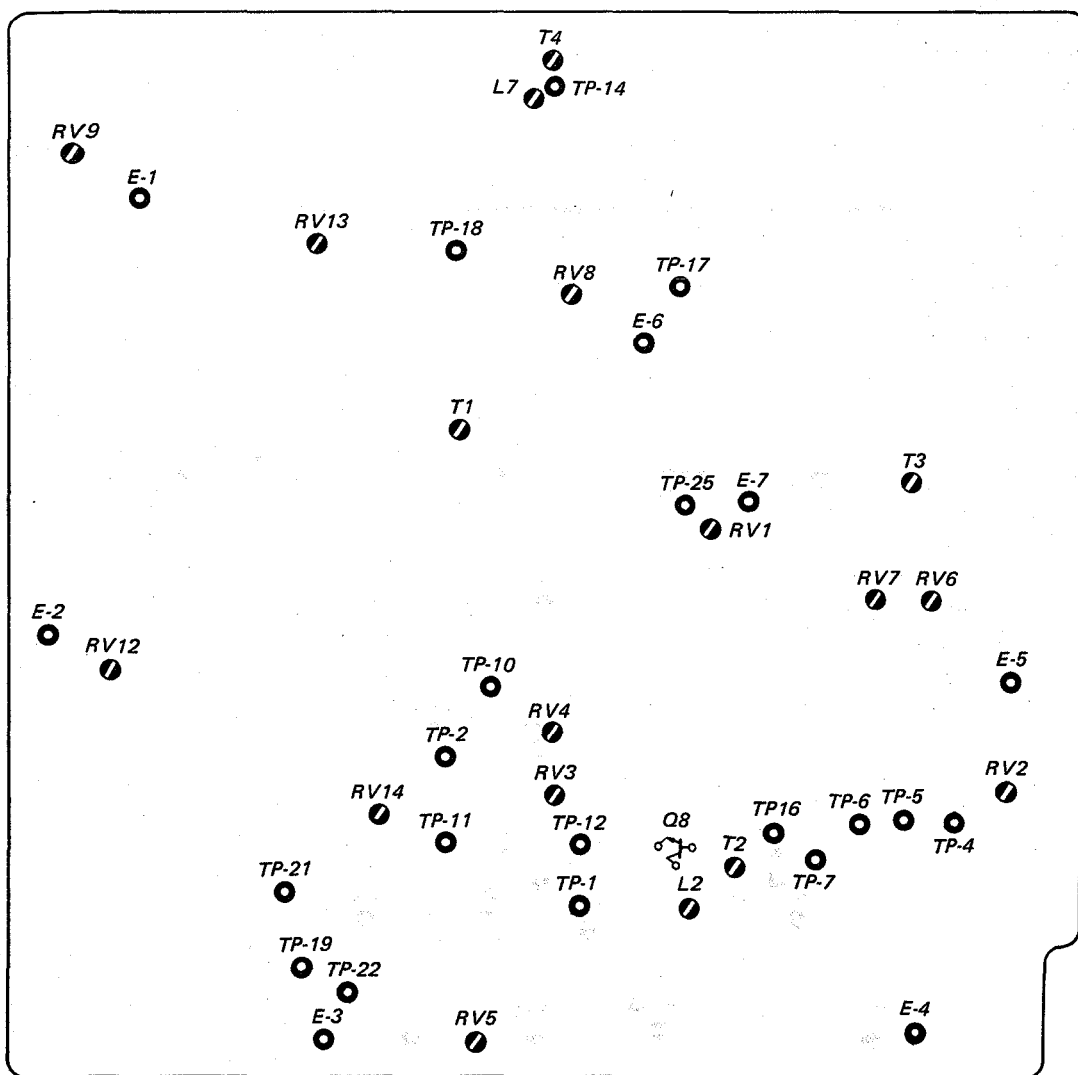


MD-5 board

RP-2 BOARD



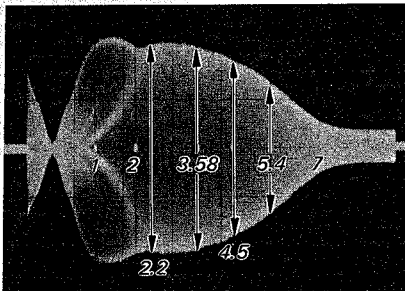
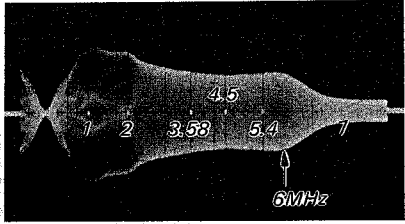
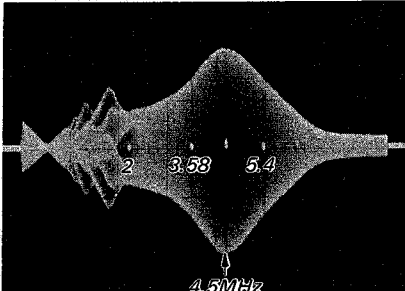
RP-2 board



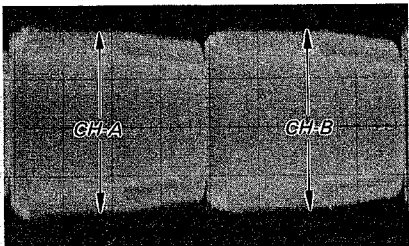
DM-8 board

10-1 PLAYBACK RF AMPLIFIER ALIGNMENT

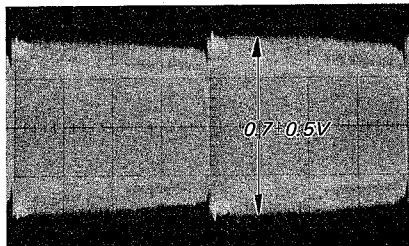
10-1-1 Playback RF Frequency Response Adjustment

machine conditions for adjustment	spec.	adjustment												
• SYSTEM SELECT SW; PAL/SECAM • TRACKING CONTROL; detent position • Playback mode; RR5-1S PAL (RF Sweep segment)	(1) Frequency Responce check  <table><tr><th>2.2MHz</th><th>3.58MHz</th><th>4.5MHz</th><th>5.4MHz</th></tr><tr><td>100%</td><td>100</td><td>90</td><td>65</td></tr><tr><td>Reference</td><td>±5%</td><td>±5%</td><td>±5%</td></tr></table> Check to see that both the CH-A and CH-B waveforms meet the required specifications. If spec. is not met, adjust as follows.	2.2MHz	3.58MHz	4.5MHz	5.4MHz	100%	100	90	65	Reference	±5%	±5%	±5%	EXT. TRIG; TP-13/RP-2 ⊖ slope; CH-A ⊕ slope; CH-B
2.2MHz	3.58MHz	4.5MHz	5.4MHz											
100%	100	90	65											
Reference	±5%	±5%	±5%											
	(2) 6MHz Tuning Adjustment RV6/RP-2 (CH-A) → fully RV5/RP-2 (CH-B) → fully RV8/RP-2 (CH-A) → fully RV7/RP-2 (CH-B) → fully 	⊗ CV2/RP-2 board (CH-A) ⊗ CV1/RP-2 board (CH-B) EXT. TRIG; TP-13/RP-2 ⊖ slope; CH-A ⊕ slope; CH-B												
	(3) 4.5MHz Tuning Adjustment RV8/RP-2 (CH-A) → fully RV7/RP-2 (CH-B) → fully 	⊗ L18/RP-2 board (CH-A) ⊗ L17/RP-2 board (CH-B) EXT. TRIG; TP-13/RP-2 ⊖ slope; CH-A ⊕ slope; CH-B												
	(4) Equalizing adjustment Adjust the following controls until the specifications in step (1) is met.	⊗ RV6/RP-2 (CH-A) } high freq. ⊗ RV5/RP-2 (CH-B) } range adj. ⊗ RV8/RP-2 (CH-A) } mid freq. ⊗ RV7/RP-2 (CH-B) } range adj.												

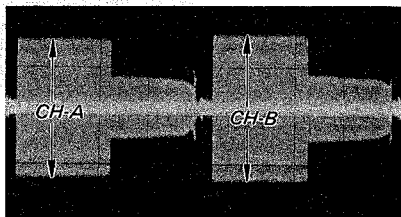
10-1-2. PLAYBACK Y-RF Output Balance Adjustment

machine conditions for adjustment	spec.	adjustment
- SYSTEM SELECT SW; PAL/SECAM - TRACKING CONTROL; detent position - Playback mode; RR5-1S PAL (Colour Bar segment)	TP-15/RP-2  CH-A = CH-B	RV9/RP-2 board EXT.TRIG; TP-13/RP-2

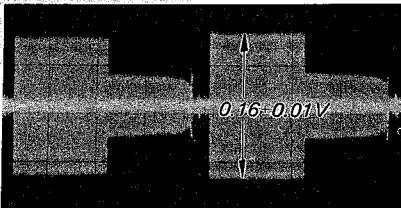
10-1-3. Playback Y-RF Output Level Adjustment

machine conditions for adjustment	spec.	adjustment
- SYSTEM SELECT SW; PAL/SECAM - TRACKING CONTROL; detent position - Playback mode; RR5-1S PAL (Colour Bar segment)	TP-15/RP-2  0.7-0.5V	RV11/RP-2 board EXT.TRIG; TP-13/RP-2

10-1-4. Playback Chroma-RF Output Balance Adjustment

machine conditions for adjustment	spec.	adjustment
- SYSTEM SELECT SW; PAL/SECAM - TRACKING CONTROL; detent position - Playback mode; RR5-1S PAL (Colour Bar segment)	TP-19/RP-2  CH-A = CH-B	RV10/RP-2 board EXT.TRIG; TP-13/RP-2

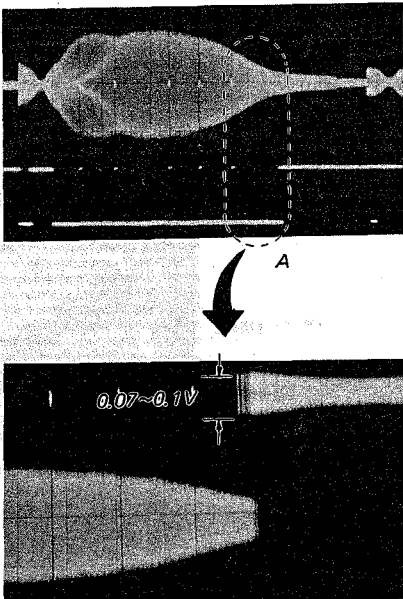
10-1-5. Playback Chroma-RF Output Level Adjustment

machine conditions for adjustment	spec.	adjustment
- SYSTEM SELECT SW; PAL/SECAM - TRACKING CONTROL; detent position - Playback mode; RR5-1S PAL (Colour Bar segment)	TP-19/RP-2  0.16-0.01V	RV12/RP-2 board EXT.TRIG; TP-13/RP-2

10-1-6. Charoma-RF Bias Trap Adjustment (AUDIO DUB)

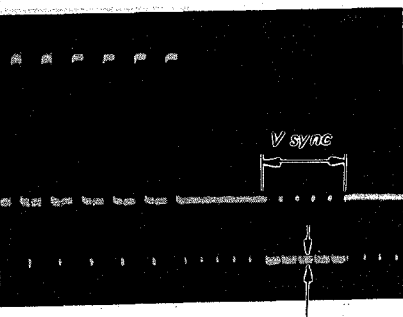
machine conditions for adjustment	spec.	adjustment
- SYSTEM SELECT SW; PAL/SECAM - AUDIO DUB mode; Tape with only CTL recorded (To make this tape; Record with CN3/RP-2 removed.	TP-19/RP-2  Minimum amplitude	⚙️ L19/RP-2 board If the minimum level is too below the amplitude of noise and difficult to identify the true minimum amplitude point, this adjustment is OK.

10-1-7. Drop-out Compensator Sensitivity Adjustment

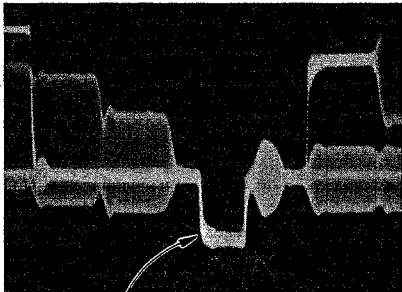
machine conditions for adjustment	spec.	adjustment
- SYSTEM SELECT SW; PAL/SECAM - Playback mode; RR5-1S PAL (RF Sweep segment)	TP-15/RP-2 TP-6/RP-2 ADD mode 	⚙️ RV4/RP-2 board If the portion "A" corresponds to any frequency marker points of the waveshape, turn the TRACKING control until the portion "A" does not correspond to any marker point. EXT. TRIG; TP-13/RP-2

10-2. Y-DEMODULATOR ALIGNMENT

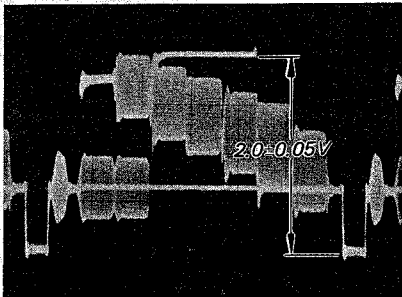
10-2-1. Y-Demodulator's Limiter Balance Adjustment

machine conditions for adjustment	spec.	adjustment
- SYSTEM SELECT SW; PAL/SECAM - Playback mode; RR5-1S PAL (Colour Bar segment)	TP-9/DM-8  Minimum amplitude	⚙️ RV13/DM-8 board EXT. TRIG; TP-2/DM-8

10-2-2. Y-Frequency Response Adjustment

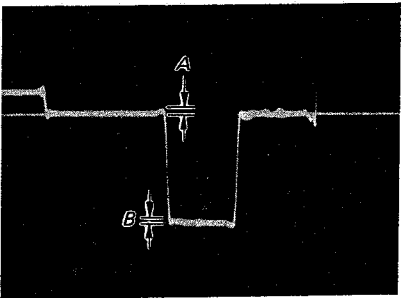
machine conditions for adjustment	spec.	adjustment
- SYSTEM SELECT SW; PAL/SECAM - Playback mode; RR5-1S PAL (Colour Bar segment)	TP-21/DM-8  Adjust for the most flat waveform	RV12/DM-8 board EXT. TRING; TP-18/DM-8

10-2-3. Y-Output Level Adjustment

machine conditions for adjustment	spec.	adjustment
- SYSTEM SELECT SW; PAL/SECAM - Playback mode; RR5-1S PAL (Colour Bar segment)	TP-21/DM-8 	RV9/DM-8 board EXT. TRIG; TP-18/DM-8

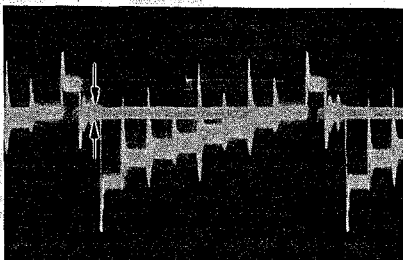
10-3 Y-SIGNAL E-E MODE ALIGNMENT

10-3-1. Colour Mode, Y-Phase Equalizing Adjustment

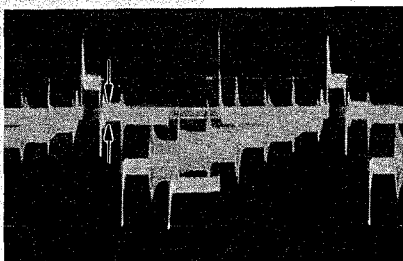
machine conditions for adjustment	spec.	adjustment
- INPUT SELECT SW; LINE - VIDEO IN; PAL or SECAM colour video signal - E-E mode	TP-7/MD-5  A=B	RV6/MD-5 board EXT TRIG; TP-18/DM-8

10-3-2. Colour Mode, Y-4.43MHz Trap Adjustment

(1) Using a PAL colour video signal

machine conditions for adjustment	spec.	adjustment
- INPUT SELECT SW; LINE - VIDEO IN; PAL colour video signal - Short IC5-PIN1 ↔ E/MD-5 with jumper - Short Q7C ↔ E1/MD-5 with jumper - E-E mode	TP-4/MD-5  Minimum amplitude	⚙️ L6/MD-5 board EXT. TRIG; TP-18/MD-5

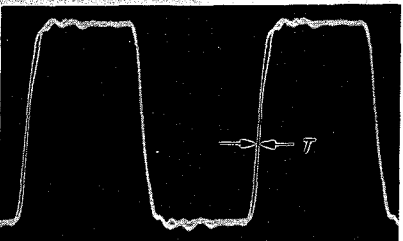
(2) Using SECAM colour video signal

machine conditions for adjustment	spec.	adjustment
- INPUT SELECT SW; LINE - VIDEO IN; SECAM colour video signal - Short IC5-PIN 1 ↔ E 1/MD-5 with jumper - Short Q7C ↔ E/MD-5 with jumper - E-E mode	TP-4/MD-5  Minimum amplitude	⚙️ L6/MD-5 board EXT. TRIG; TP-18/MD-5

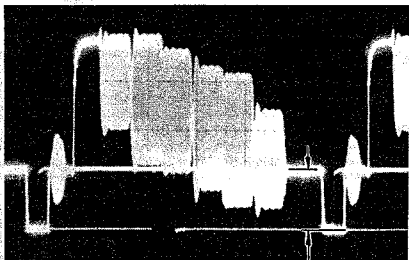
10-3-3. Sync Tip Carrier Frequency Adjustment

machine conditions for adjustment	spec.	adjustment
- INPUT SELECT SW; LINE - VIDEO IN; no signal - E-E mode	TP-9/MD-5 board $3.80 \pm 0.05\text{MHz}$	⚙️ RV2/MD-5 board

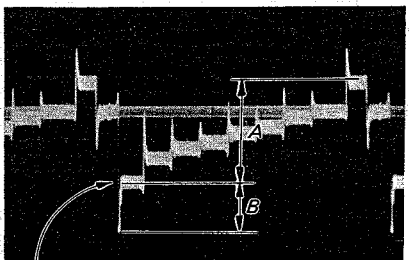
10-3-4. Y-FM Modulator Balance Adjustment

machine conditions for adjustment	spec.	adjustment
- INPUT SELECT SW; LINE - VIDEO IN; no signal - E-E mode	TP-9/MD-5 ; scope CH-A } ALT mode TP-9/MD-5 (INVERT); scope CH-B }  T=0	RV3/MD-5 board

10-3-5. Y-FM Deviation Adjustment

machine conditions for adjustment	spec.	adjustment
- INPUT SELECT SW; LINE - VIDEO IN; PAL or SECAM colour video signal - E-E mode	TP-21/DM-8  0.6 ± 0.02V	RV1/MD-5 board EXT. TRIG; TP-18/DM-8

10-3-6. White Clip Adjustment

machine conditions for adjustment	spec.	adjustment
- INPUT SELECT SW; LINE - VIDEO IN; 75% colour bar or any signal that has definite 100% white peak level. - E-E mode	TP-4/MD-5  100% white peak A : B = 2 : 1 ± 0.05	RV4/MD-5 board EXT-TRIG; TP-18/DM-8

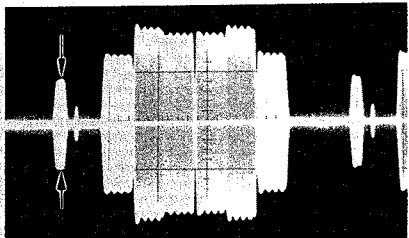
10-4. CHROMA SIGNAL E-E MODE ALIGNMENT

10-4-1. 5.12MHz Oscillator Frequency Adjustment

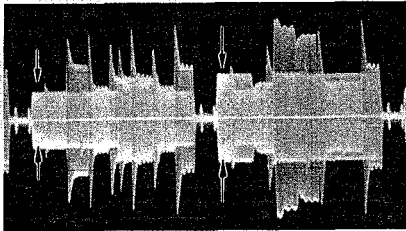
machine conditions for adjustment	spec.	adjustment
E-E mode	TP-8/MD-5 5, 119, 174 ± 5Hz	C83/MD-5 board

10-4-2. Record ACC Burst Tuning

(1) Using a PAL colour video signal

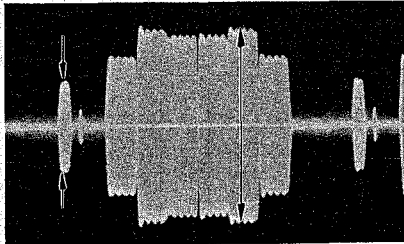
machine conditions for adjustment	spec.	adjustment
- INPUT SELECT SW; LINE - VIDEO IN; PAL colour video signal - E-E mode	TP-6/MD-5  Minimum amplitude	T2/MD-5 board EXT. TRIG; TP-18/DM-8

(2) Using a SECAM colour video signal

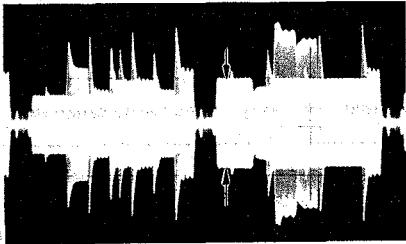
machine conditions for adjustment	spec.	adjustment
- INPUT SELECT SW; LINE - VIDEO IN; SECAM colour video signal - E-E mode	TP-6/MD-5  Minimum amplitude	T2/MD-5 board EXT.TRIG; TP-18/DM-8

10-4-3. Record ACC Level Adjustment

(1) Using a PAL colour video signal

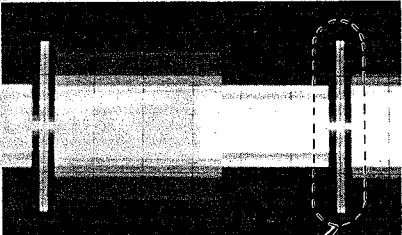
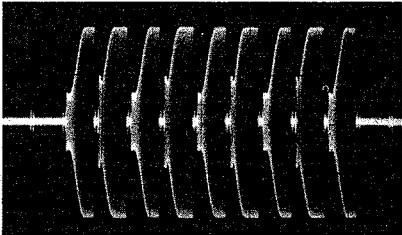
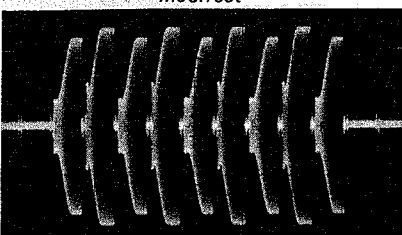
machine conditions for adjustment	spec.	adjustment
- INPUT SELECT SW; LINE - VIDEO IN; PAL color video signal - E-E mode	TP-6/MD-5  $0.42 \pm 0.02V$ $(1.0 \pm 0.05V)$	RV5/MD-5 board EXT.TRIG; TP-18/DM-8

(2) Using a SECAM colour video signal

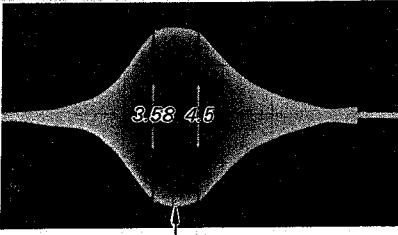
machine conditions for adjustment	spec.	adjustment
- INPUT SELECT SW; LINE - VIDEO IN; SECAM colour video signal - E-E mode	TP-6/MD-5  $0.42 \pm 0.02V$	RV5/MD-5 board EXT.TRIG; TP-18/DM-8

10-4.4. Record Chroma Frequency Response

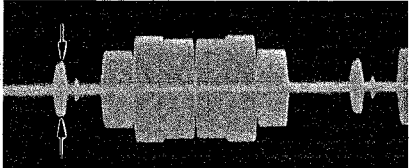
(1) Using a SECAM colour video signal

machine conditions for adjustment	spec.	adjustment
• INPUT SELECT SW; LINE • VIDEO IN; SECAM colour video signal • E-E mode	TP-6/MD-5  correct  incorrect  Confirm the IC5-PIN 13/MD-5 level is more than 0.5Vp-p	● T1/MD-5 board EXT. TRIG; TP-9/SV-10

(2) Without a SECAM colour video signal then using a video sweep generator

machine conditions for adjustment	spec.	adjustment
• INPUT SELECT SW; LINE • VIDEO IN; video sweep signal • E-E mode	IC5-PIN 13 /MD-5  4.08MHz peak	● T1/MD-5 board

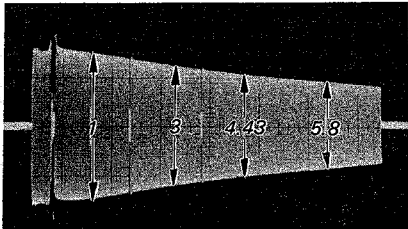
- (3) Without a SECAM colour video signal & a video sweep generator → using a PAL colour video signal

machine conditions for adjustment	spec.	adjustment
- INPUT SELECT SW; LINE - VIDEO IN; PAL colour video signal - E-E mode	IC5-PIN 13 /MD-5  Maximum amplitude	⌚ T1/MD-5 board EXT.TRIG; TP-18/DM-8

10-5. RECORD AMPLIFIER ALIGNMENT

10-5-1. Y-Record Frequency Response Adjustment

- (1) Using a video sweep generator

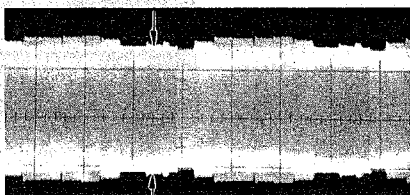
machine conditions for adjustment	spec.	adjustment												
● INPUT SELECT SW; LINE ● VIDEO IN; no signal ● Short TP-1 ↔ EP-3/RP-2 with jumper ● Feed a sweep signal at TP-2/RP-2 (GND; EP-3) ● Record mode	(0.3V) (0.18V)  <table><tr><th>1MHz</th><th>3MHz</th><th>4.43MHz</th><th>5.8MHz</th></tr><tr><td>100%</td><td>80</td><td>70</td><td>60</td></tr><tr><td>refer</td><td>±10%</td><td>±10%</td><td>±5%</td></tr></table>	1MHz	3MHz	4.43MHz	5.8MHz	100%	80	70	60	refer	±10%	±10%	±5%	● RV2/RP-2 board
1MHz	3MHz	4.43MHz	5.8MHz											
100%	80	70	60											
refer	±10%	±10%	±5%											

- (2) Without video sweep generator, then using a 100% white peak signal

machine conditions for adjustment	spec.	adjustment
- SYSTEM SELECT SW; PAL/SECAM - INPUT SELECT SW; LINE - VIDEO IN; PAL or SECAM 75% colour bar or any signal that has definite 100% white peak level. - Record mode	100% white level $0.185 \pm 0.01V$  TP-10/RP-2 (GND; TP-9) TP-1/MD-5 Sync tip level $0.25 \pm 0.01V$	⌚ RV2/RP-2 board (100% white level) ⌚ RV1/RP-2 board (Sync tip level) EXT.TRIG; TP-18/DM-8

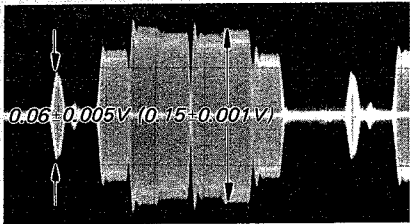
10-5-2. Y-Record Current Level Adjustment

NOTE: If video sweep generator used in sec. 10-5-1.

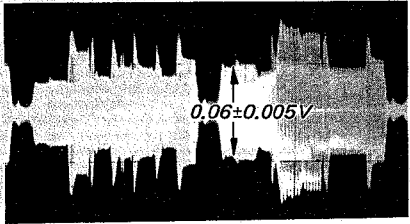
machine conditions for adjustment	spec.	adjustment
- SYSTEM SELECT SW; PAL/SECAM - INPUT SELECT SW; LINE - VIDEO IN; PAL or SECAM colour video signal - Record mode	TP-10/RP-2 (GND; TP-9)  SYNC level $0.25 \pm 0.01V$	RV1/RP-2 board EXT. TRIG; TP-18/DM-8

10-5-3. Chroma Record Current Adjustment

(1) Using a PAL colour video signal

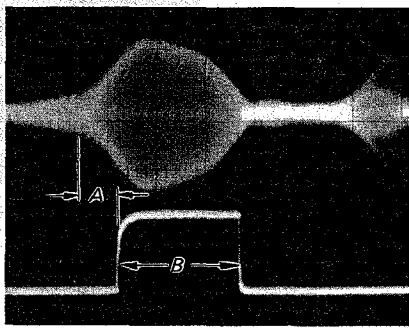
machine conditions for adjustment	spec.	adjustment
- SYSTEM SELECT SW; PAL/SECAM - INPUT SELECT SW; LINE - TRACKING CONTROL; detent position - VIDEO IN; PAL colour video signal - Self Record and then Playback mode	TP-1/DM-8 (while playing back the self recorded section)  $0.05 \pm 0.005V$ (0.15 - 0.001V) If CH-A and CH-B different amplitude, take reading of higher amplitude channel.	RV3/RP-2 board (Perform adjustment during Record mode) Repeat the sequence of adj. → Record → Playback (level check) until required specification is met. Ref; The standard burst amplitude of TP-10/RP-2 (at TP-2 ↔ E-4/RP-2 shorted) is 0.05V. EXT. TRIG; TP-18/DM-8

(2) Using a SECAM colour video signal

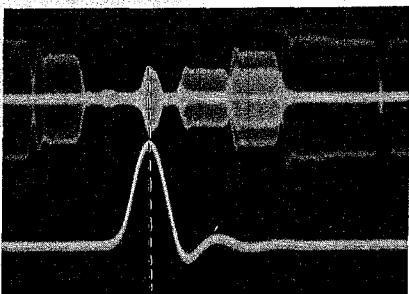
machine conditions for adjustment	spec.	adjustment
- SYSTEM SELECT SW; PAL/SECAM - INPUT SELECT SW; LINE - TRACKING CONTROL; detent position - VIDEO IN; SECAM colour video signal - Self Record and then Playback mode	TP-1/DM-8 (while playing back the self recorded section)  $0.06 \pm 0.005V$ If CH-A and CH-B different amplitude, take reading of higher amplitude channel.	RV3/RP-2 board (Perform adjustment during Record mode) Repeat the sequence of adj. → Record → Playback (level check) until required specification is met. Ref; The standard burst amplitude of TP-10/RP-2 (at TP-2 ↔ E-4/RP-2 shorted) is 0.05V. EXT. TRIG; TP-18/DM-8

10-6. PLAYBACK CHROMA ALIGNMENT

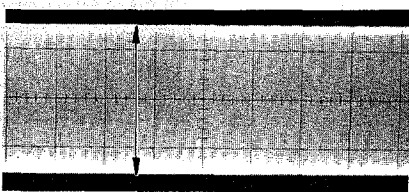
10-6-1. APC Burst Flag Phase/Width Adjustment

machine conditions for adjustment	spec.	adjustment
• SYSTEM SELECT SW; PAL/SECAM • Playback mode; RR5-1S PAL	TP-11/DM-8 CHOP mode TP-16/DM-8 	• RV6/DM-8 board $A=0.5\pm0.1\mu S$ • RV7/DM-8 board $B=2.5\pm0.1\mu S$ EXT. TRIG; TP-18/DM-8

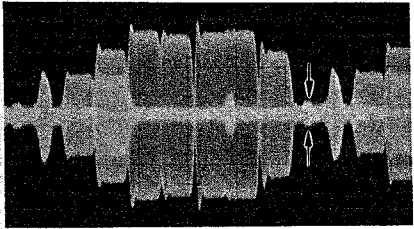
10-6-2. Playback ACC Burst Flag Phase Adjustment

machine conditions for adjustment	spec.	adjustment
• SYSTEM SELECT SW; PAL/SECAM • Playback mode; RR5-1S PAL	TP-12/DM-8 CHOP mode TP-18/DM-8  Both peaks should be in phase.	• L7/DM-8 board EXT. TRIG; TP-18/DM-8

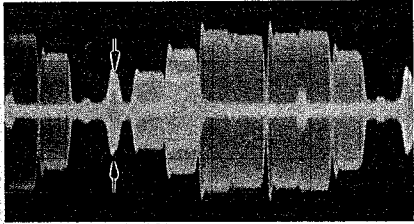
10-6-3. 5.12 MHz Tuning Adjustment

machine conditions for adjustment	spec.	adjustment
• SYSTEM SELECT SW; PAL/SECAM • E-E mode	TP-25/DM-8  Maximum amplitude	• T3/DM-8 board

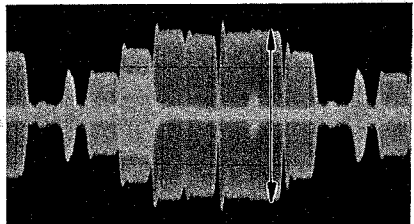
10-6.4. 4.43MHz Frequency Converter Balance Adjustment

machine conditions for adjustment	spec.	adjustment
- SYSTEM SELECT SW; PAL/SECAM - Playback mode; RR5-1S PAL (Colour bar segment)	TP-11/DM-8  Minimum amplitude	RV1/DM-8 board EXT. TRIG; TP-18/DM-8

10-6-5. Playback ACC Burst Tuning Adjustment

machine conditions for adjustment	spec.	adjustment
- SYSTEM SELECT SW; PAL/SECAM - Playback mode; RR5-1S PAL (Colour bar segment)	TP-12/DM-8  Minimum amplitude	T1/DM-8 board EXT. TRIG; TP-18/DM-8

10-6-6. APC Gain Adjustment

machine conditions for adjustment	spec.	adjustment
- SYSTEM SELECT SW; PAL/SECAM - Playback mode; RR5-1S PAL (Colour bar segment)	TP-12/DM-8  0.35±0.02V	RV3/DM-8 EXT. TRIG; TP-18/DM-8

10-6-7. Playback Colour Killer Adjustment

machine conditions for adjustment	spec.	adjustment
- SYSTEM SELECT SW; PAL/SECAM - TRACKING CONTROL; detent position - Temporarily connect a resistor 110Ω across R98. - Playback mode; RR5-1S PAL (Colour bar segment)	TP-10/DM-8	- RV4/DM-8 board - fully (TP-10; 0Vdc) (MONITOR; B/W) - RV4/DM-8 board - Slowly up to the point indicating 4Vdc at TP-10. (MONITOR; Colour)
	Change the resistor to 100Ω Confirm that the TP-10 dc voltage is now 0Vdc. (MONITOR; B/W) If it is 4Vdc, repeat the adjustment. (MONITOR; Colour)	

10-6-8. 4.43 MHz Reference Oscillator Frequency Adjustment

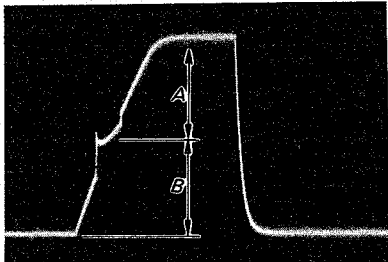
(1) Using a PAL colour video signal

machine conditions for adjustment	spec.	adjustment
- SYSTEM SELECT SW; PAL/SECAM - INPUT SELECT SW; LINE - VIDEO IN; PAL colour video signal - Short Q8B → E/DM-8 - E-E mode	TP-7/DM-8 ; scope CH-A) ADD mode TP-5/DM-8 (INVERT); scope CH-B) correct $T \geq 0.2 \text{ sec}$ 0.1sec/div incorrect 0.1sec/div	T2/DM-8 board

(2) Without a PAL colour video signal

machine conditions for adjustment	spec.	adjustment
- SYSTEM SELECT SW; PAL/SECAM - Playback mode; RR5-1S PAL or RR4-7S SECAM	TP-8/DM-8 $4,433,618 \pm 10\text{Hz}$	T2/DM-8 board

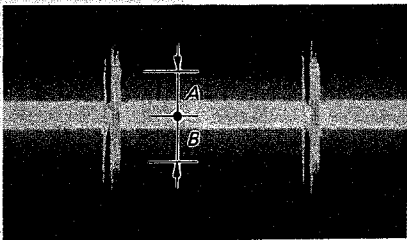
10-6-9. AFC VCO Frequency Adjustment

machine conditions for adjustment	spec.	adjustment
- SYSTEM SELECT SW; PAL/SECAM - Playback mode; RR5-1S PAL (Colour bar segment)	TP-17/DM-8 	RV8/DM-8 board

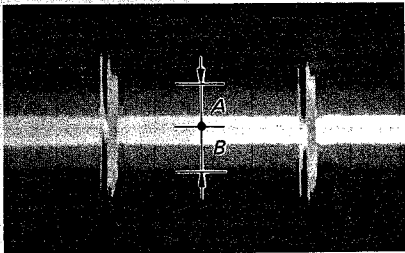
10-6-10. 3.58MHz Local Oscillator Frequency Adjustment

machine conditions for adjustment	spec.	adjustment
E-E mode	TP-14/DM-8 $3,579,545 \pm 50\text{Hz}$	T4/DM-8 board

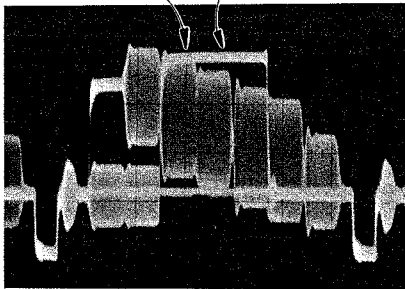
10-6-11. APC VCO Frequency Adjustment

machine conditions for adjustment	spec.	adjustment
- SYSTEM SELECT SW; PAL/SECAM - Short TP-4 $\longleftrightarrow$ TP-6/DM-8 with jumper - Playback mode; RR5-1S PAL (Colour bar segment)	TP-5/DM-8 : scope CH-A) ADD mode TP-7/DM-8 (INVERT); scope CH-B) 	L2/DM-8 board Correct HUE is obtained on monitor. EXT. TRIG; TP-2/DM-8

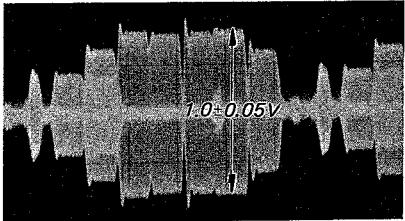
10-6-12. Colour Lock Control Calibration

machine conditions for adjustment	spec.	adjustment
- SYSTEM SELECT SW; PAL/SECAM - COLOUR LOCK CONTROL; detent position - Playback mode; RR5-1S PAL (Colour bar segment)	TP-5/DM-8 ; scope CH-A) ADD mode TP-7/DM-8 (INVERT); scope CH-B  A=B	RV2/DM-8 board Correct HUE is obtained on monitor. EXT. TRIG; TP-2/DM-8

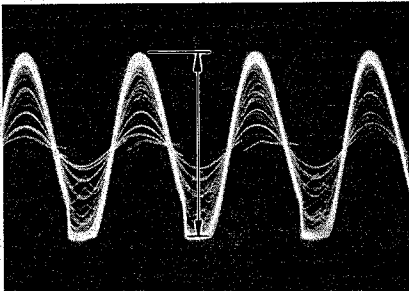
10-6-13. Chroma Output Level Adjustment

machine conditions for adjustment	spec.	adjustment
- SYSTEM SELECT SW; PAL/SECAM - Playback mode; RR5-1S PAL (Colour bar segment)	TP-21/DM-8  Cyan peak = 100% white peak	RV14/DM-8 board EXT. TRIG; TP-18/DM-8

10-6-14. Dub Chroma Output Level Adjustment

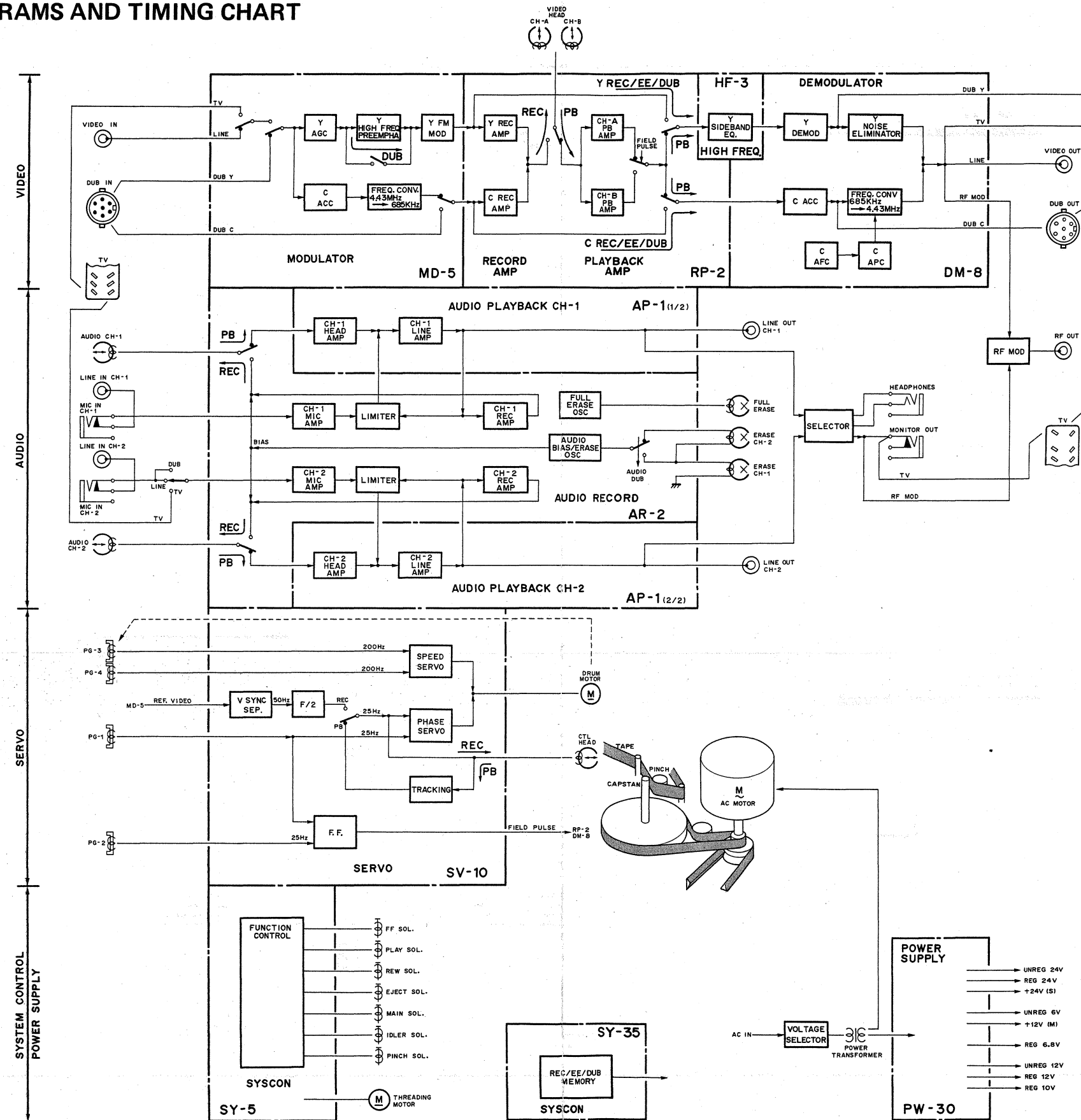
machine conditions for adjustment	spec.	adjustment
- SYSTEM SELECT SW; PAL/SECAM - Playback mode; RR5-1S PAL (colour bar segment)	TP-22/DM-8  1.0-0.05V	RV5/DM-8 board EXT. TRIG; TP-18/DM-8

10-7. SECAM SIGNAL DETECTOR FH/2 TUNING

machine conditions for adjustment	spec.	adjustment
• SYSTEM SELECT SW; PAL/SECAM • Playback mode; RR4-7S SECAM	<i>TP-18/RP-2</i>  <i>Maximum amplitude</i>	● <i>L5/RP-2 board</i>

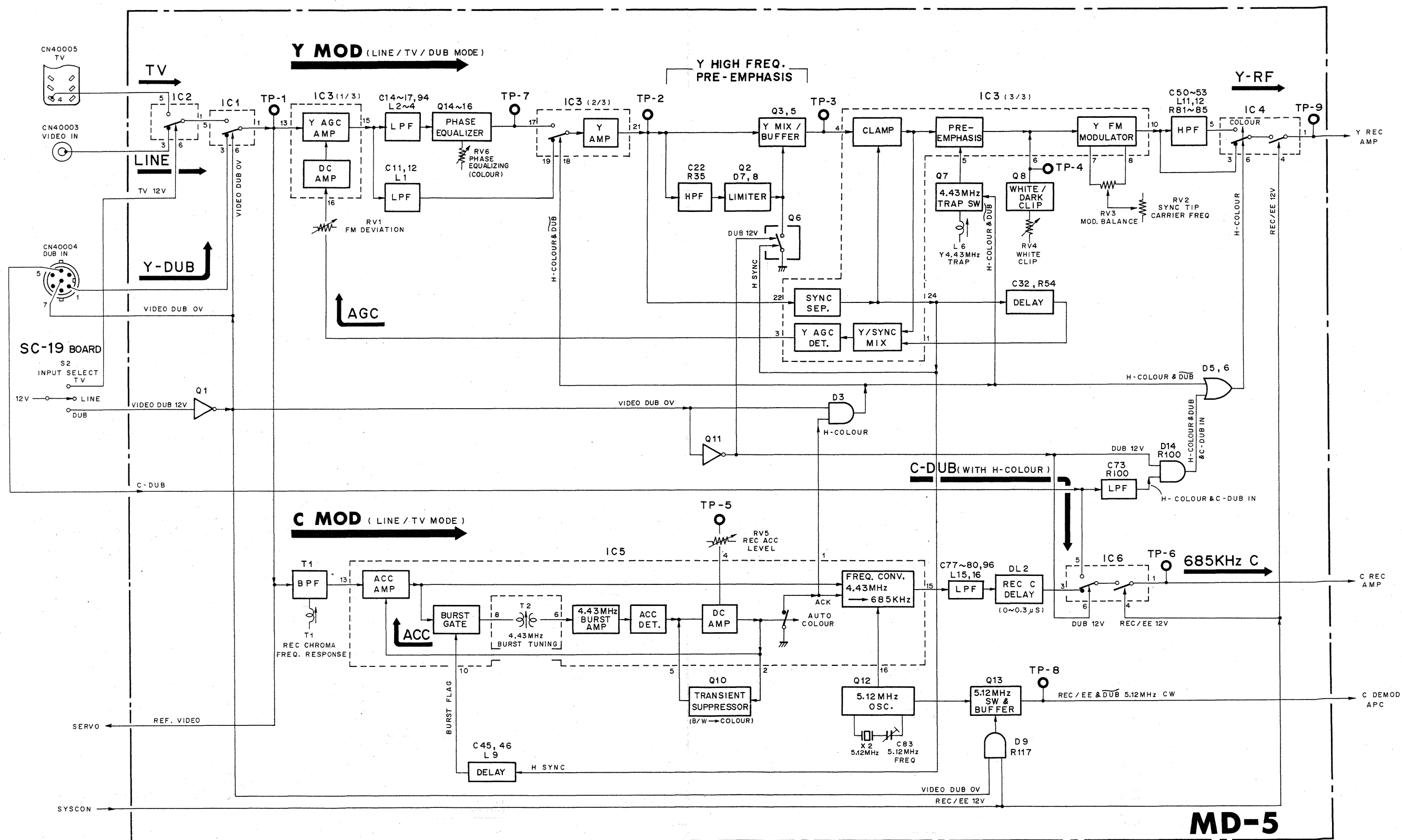
SECTION 11 BLOCK DIAGRAMS AND TIMING CHART

OVERALL BLOCK DIAGRAM

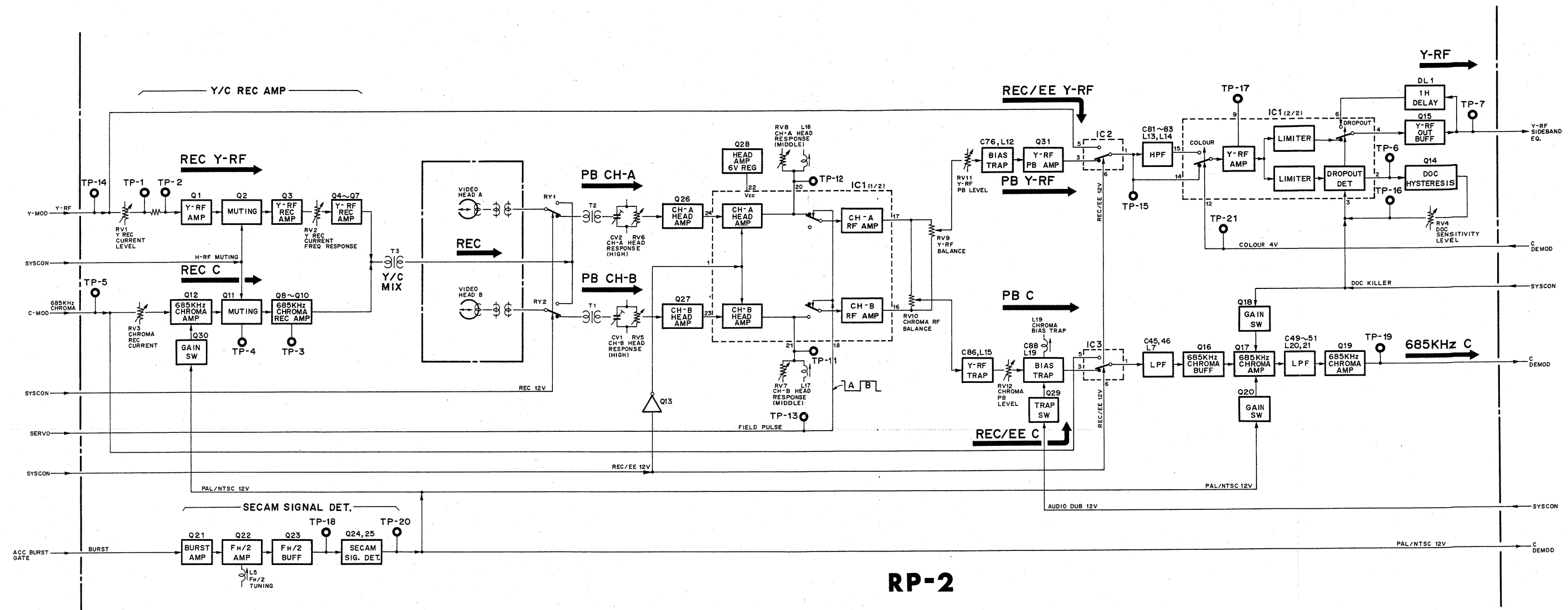


Y/C MOD	Y/C MOD
---------	---------

Y/C MODULATOR BLOCK DIAGRAM



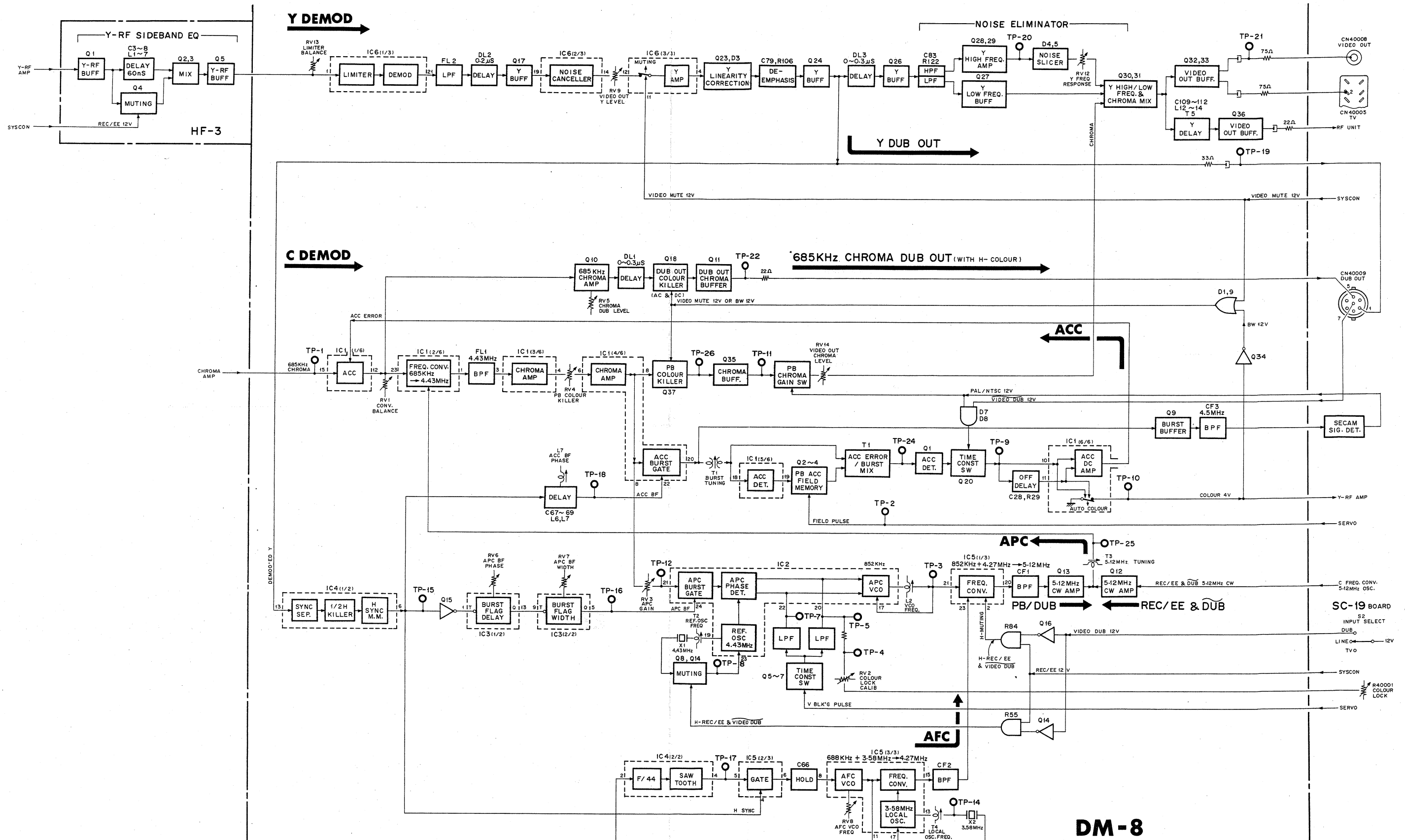
Y/C REC PB AMPLIFIER BLOCK DIAGRAM



RP-2

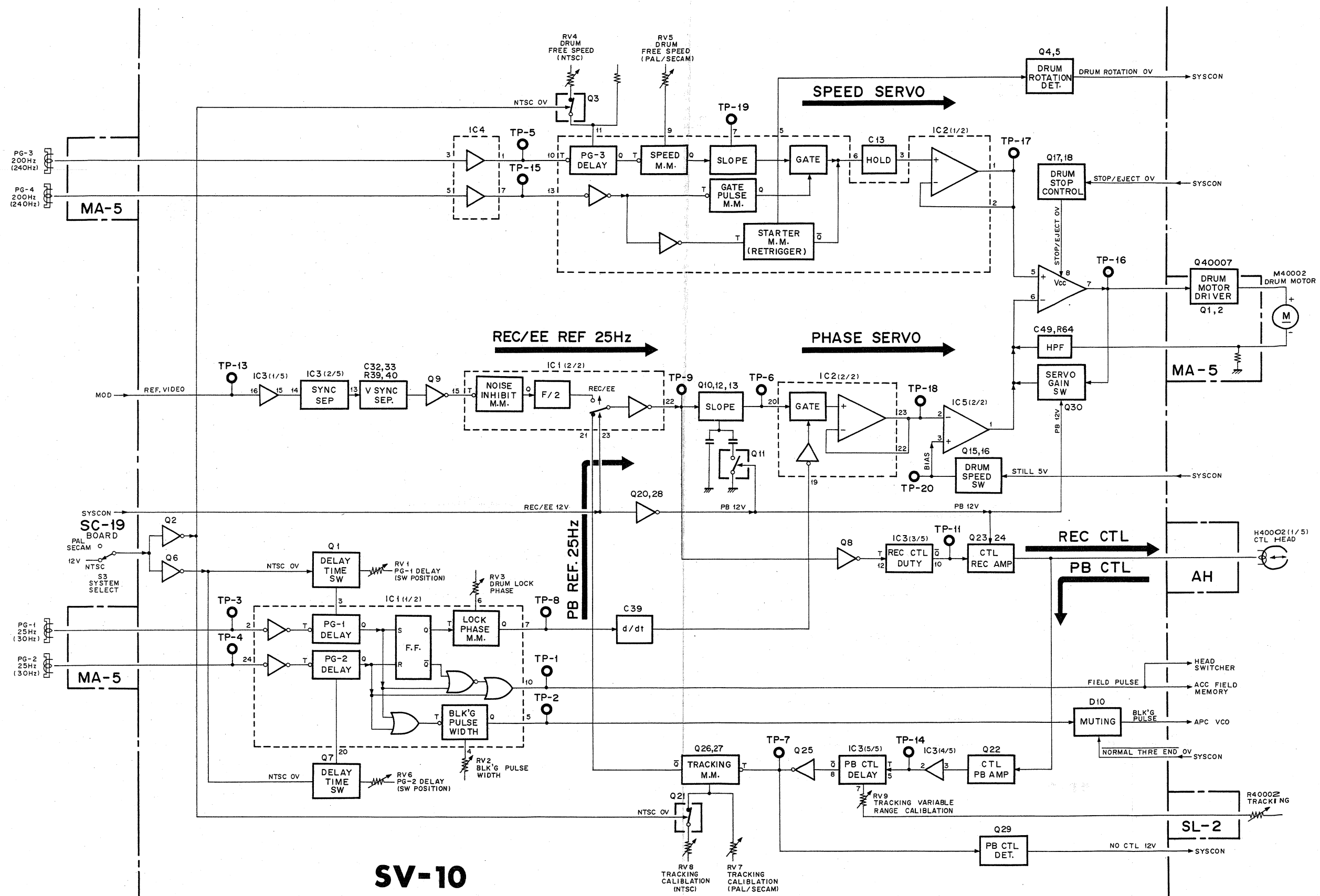
Y/C DEMOD Y/C DEMOD

Y/C DEMODULATOR BLOCK DIAGRAM



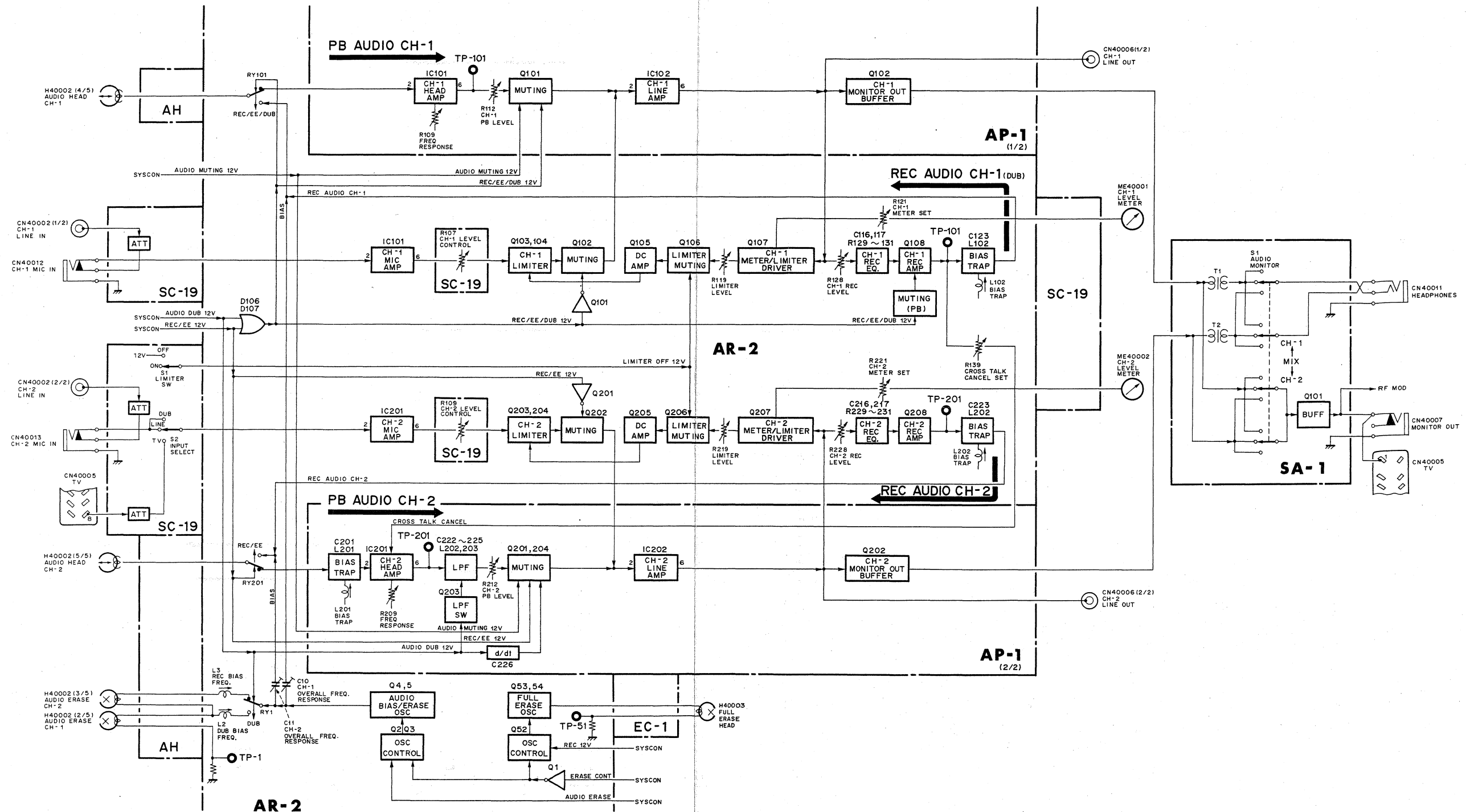
SERVO SERVO

SERVO SYSTEM BLOCK DIAGRAM



SV-10

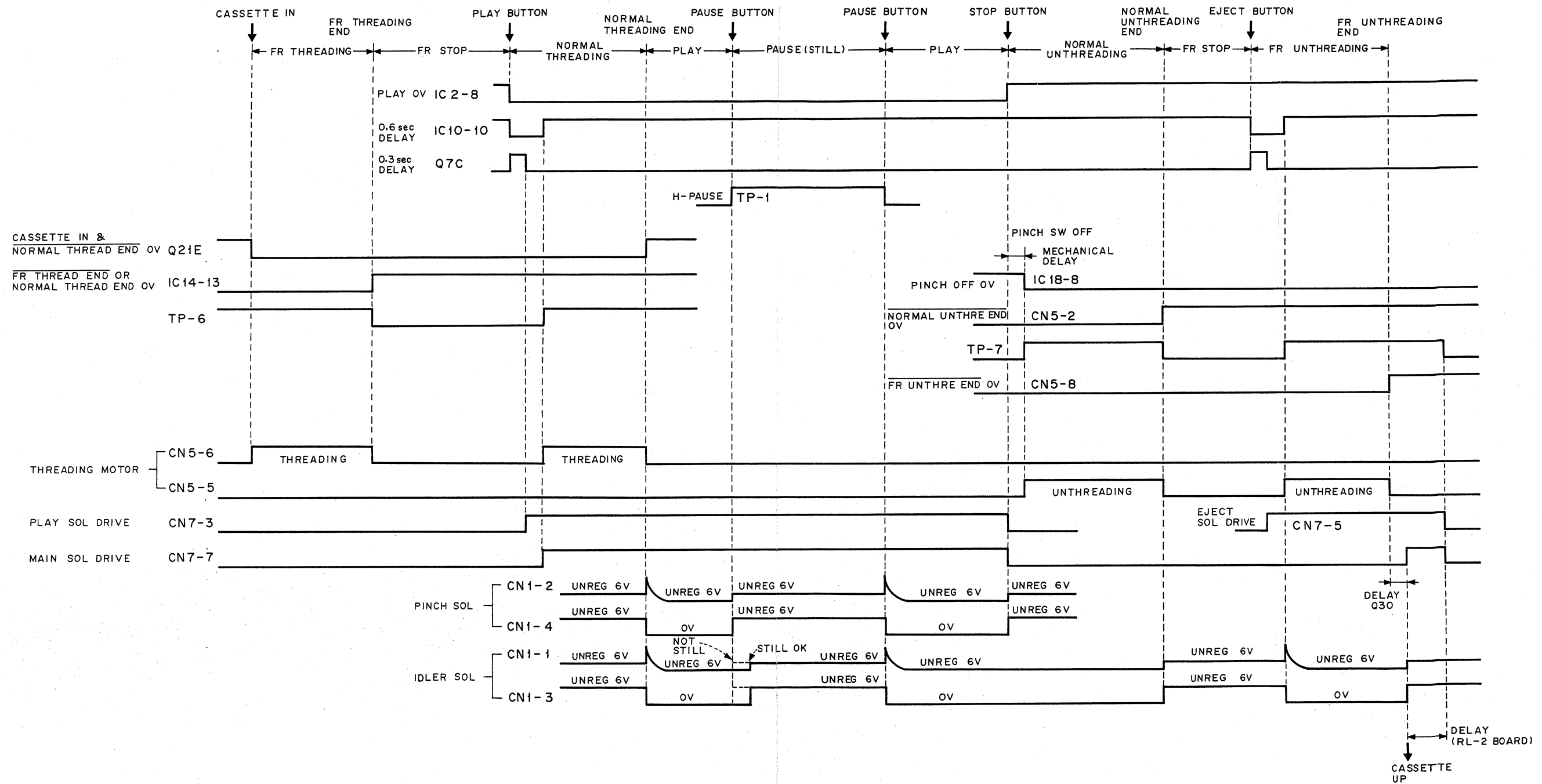
AUDIO SYSTEM BLOCK DIAGRAM



TIMING CHART

TIMING CHART

MECHANICAL SYSTEM CONTROL (SY-5) TIMING CHART



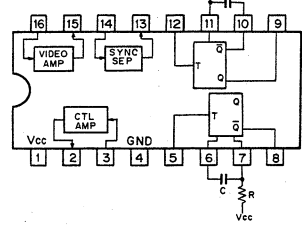
SECTION 12

PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

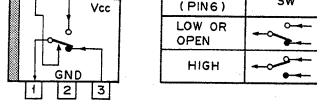
IC

AN301 (PANASONIC)

- TOP VIEW -

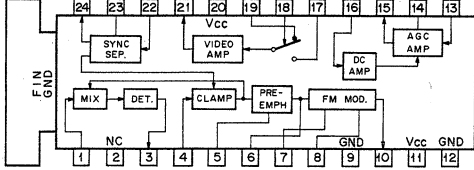
CX130 (SONY)
ANALOG SWITCH

- TOP VIEW -



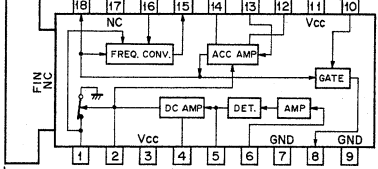
CX131A (SONY)

- TOP VIEW -



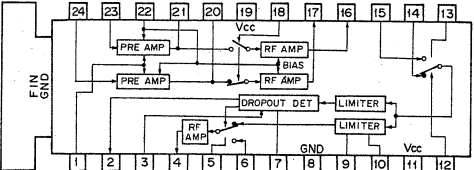
CX133A (SONY)

- TOP VIEW -



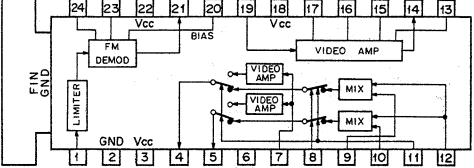
CX134A (SONY)

- TOP VIEW -



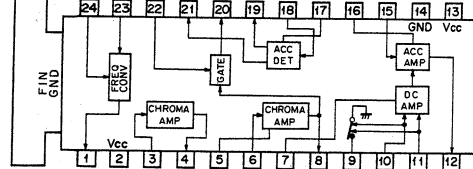
CX135 (SONY)

- TOP VIEW -



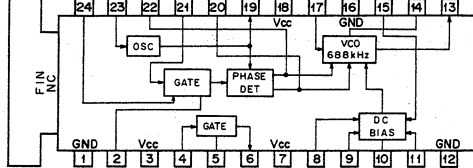
CX136A (SONY)

- TOP VIEW -



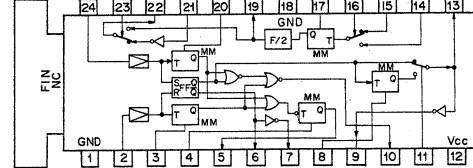
CX137A (SONY)

- TOP VIEW -



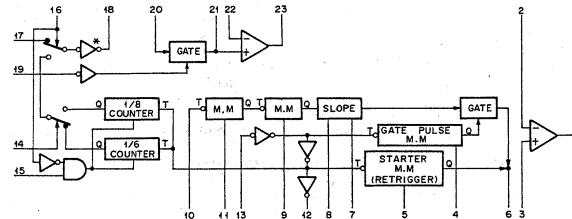
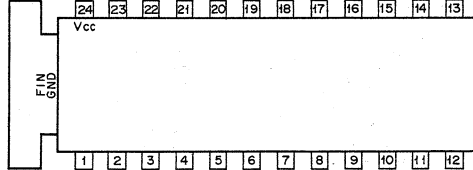
CX138 (SONY)

- TOP VIEW -



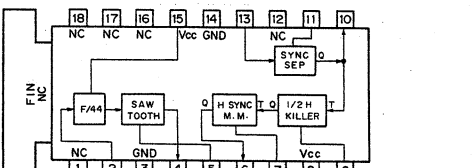
CX143A (SONY)

- TOP VIEW -

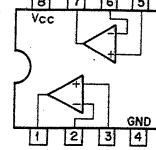


CX145 (SONY)

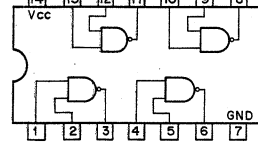
- TOP VIEW -

LM1458N (NSC)
HA17458GS (HITACHI)
JPC1458C (NEC)
OPERATIONAL AMPLIFIER

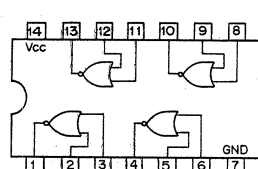
- TOP VIEW -

SN7400N (TI)
M53200P (MITSUBISHI)
TTL NAND GATE

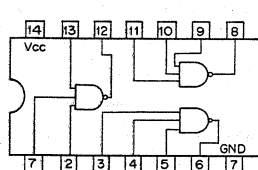
- TOP VIEW -

SN7402N (TI)
M53202P (MITSUBISHI)
TTL 2-INPUT POSITIVE-NOR GATE

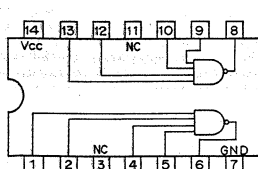
- TOP VIEW -

SN7410N (TI)
M53210P (MITSUBISHI)
TTL 3-INPUT POSITIVE NAND GATE

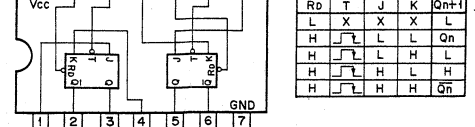
- TOP VIEW -

SN7420N (TI)
M53220P (MITSUBISHI)
TTL 4-INPUT POSITIVE NAND GATE

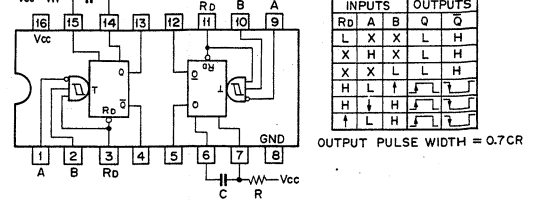
- TOP VIEW -

SN74107N (TI)
M53307P (MITSUBISHI)
TTL J-K FLIP FLOP WITH DIRECT RESET

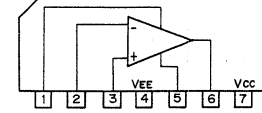
- TOP VIEW -

SN74LS22N (TI)
TTL MONOSTABLE MULTIVIBRATOR WITH SCHMITT TRIGGER INPUT

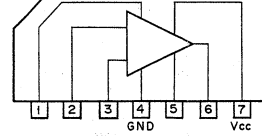
- TOP VIEW -

TA7504S (TOSHIBA)
TA7504S-R (LOW NOISE SELECTED)
OPERATIONAL AMPLIFIER

- SIDE VIEW -

TA7122AP (TOSHIBA)
PRE/EQUALIZER AMP

- SIDE VIEW -



MD-5

MD-5

MD-5 (Y/C MODULATOR)

C83 E-1
CN1 A-1
CN2 D-3
CN3 E-2
CN4 A-2

D1 A-1
D2 A-2
D3 C-2
D4 A-4
D5 D-3
D6 D-3
D7 E-4
D8 E-4
D9 E-2
D11 E-2
D12 C-3
D14 D-3

DL2 E-2
E-1 B-4
E-2 D-3

IC1 A-2
IC2 A-1
IC3 B-3
IC4 D-4
IC5 B-1
IC6 D-3

L6 C-3

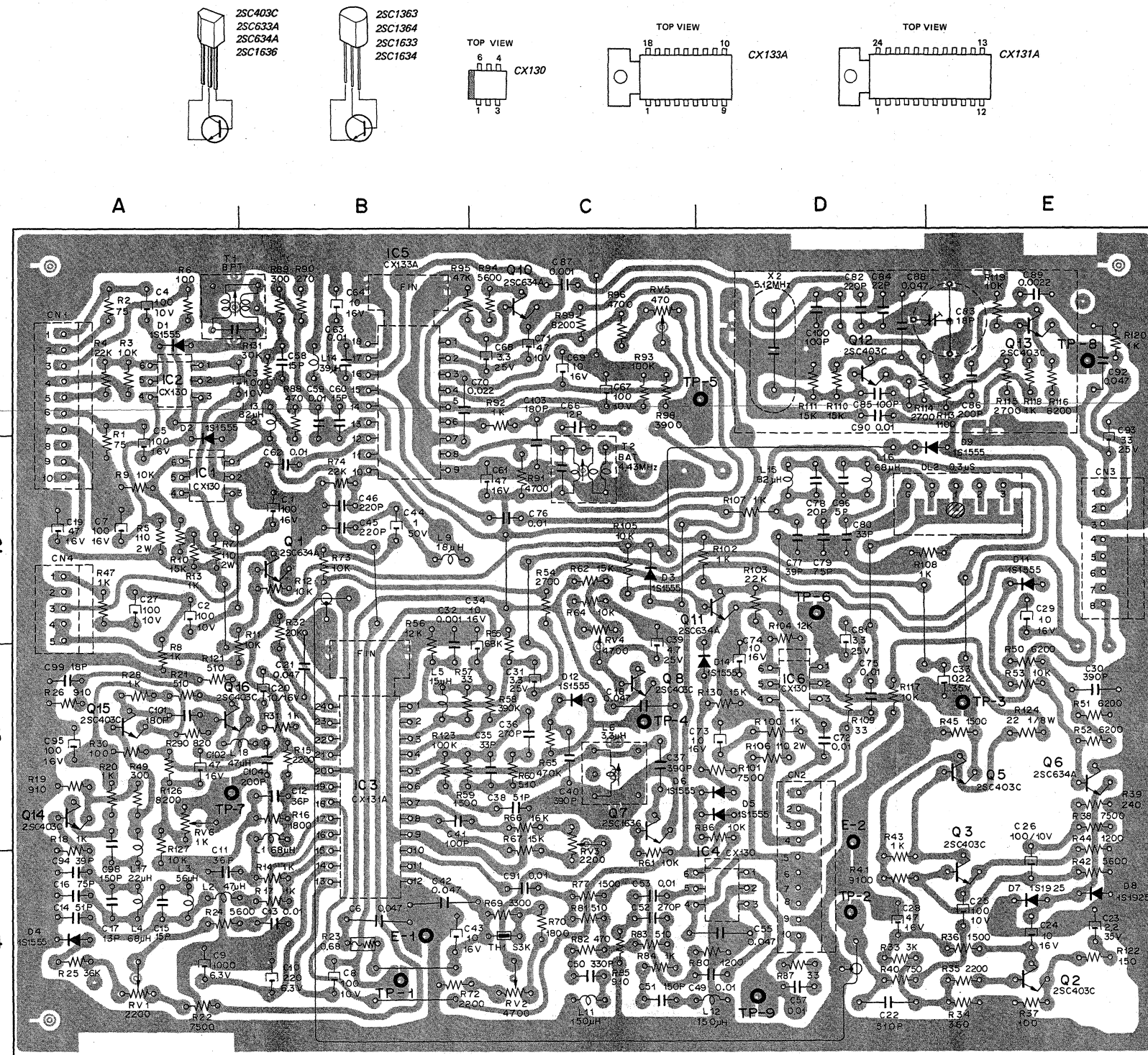
Q1 B-2
Q2 E-4
Q3 E-4
Q5 E-3
Q6 E-3
Q7 C-3
Q8 C-3
Q10 C-1
Q11 D-2
Q12 D-1
Q13 E-1
Q14 A-3
Q15 A-3
Q16 A-3

RV1 A-4
RV2 C-4
RV3 C-4
RV4 C-3
RV5 C-1
RV6 A-3

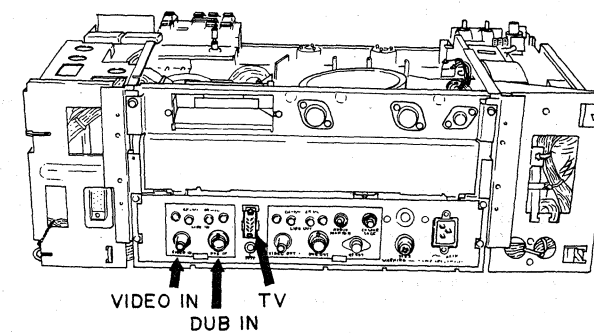
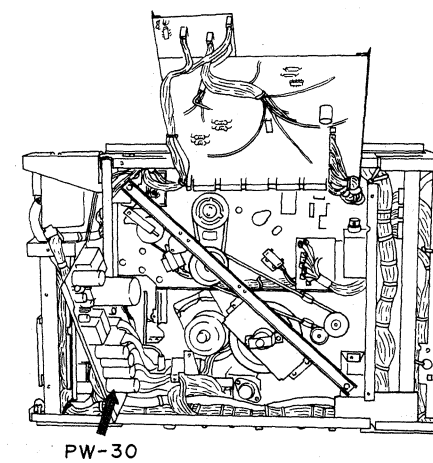
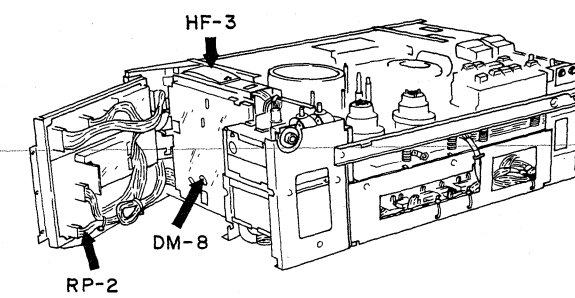
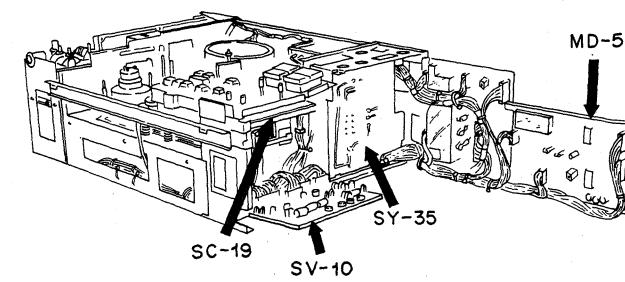
T1 A-1
T2 C-2

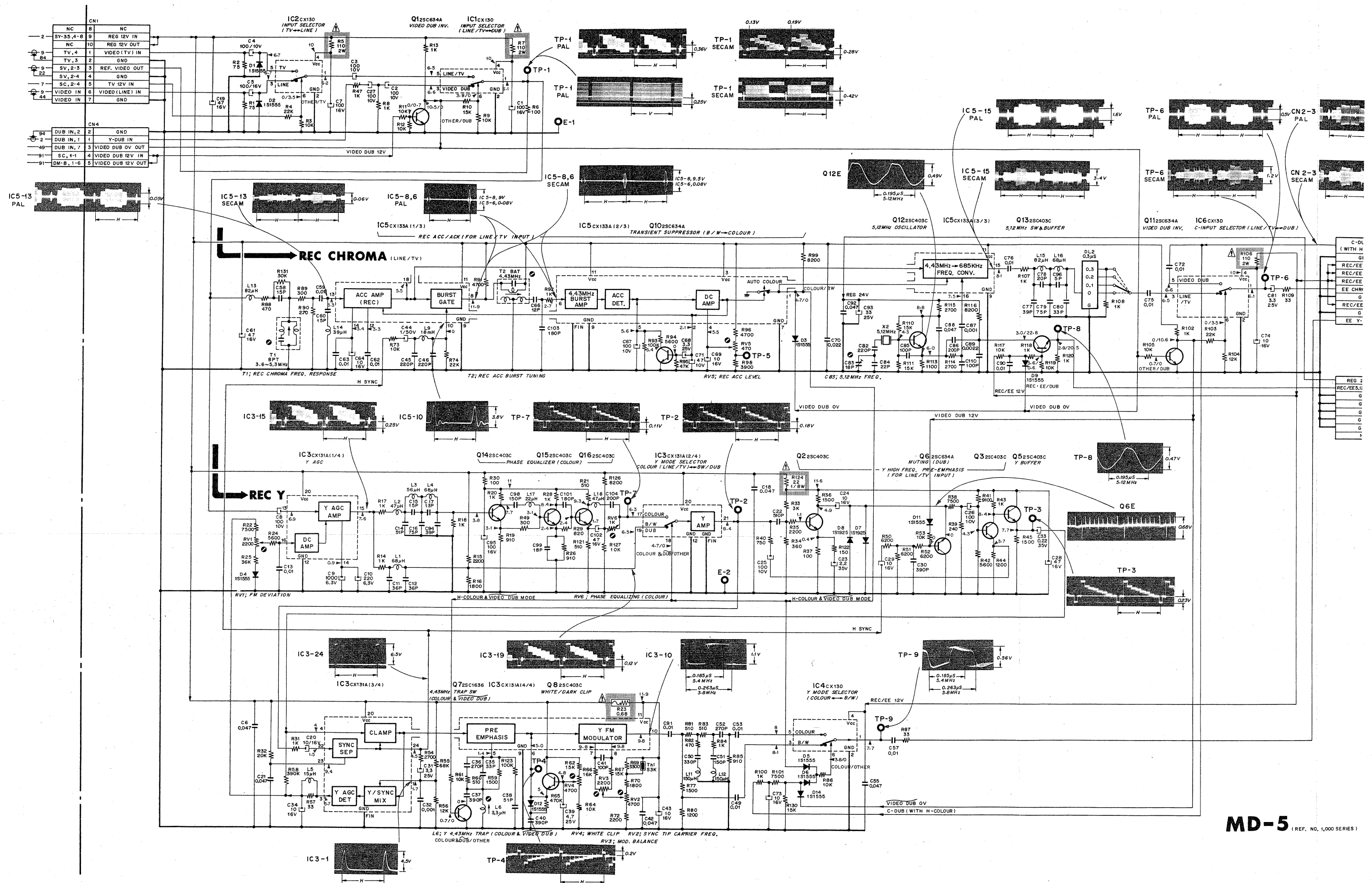
TP-1 B-4
TP-2 D-4
TP-3 E-3
TP-4 C-3
TP-5 D-1
TP-6 D-2
TP-7 A-3
TP-8 E-1
TP-9 D-4

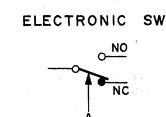
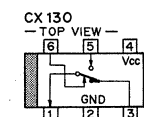
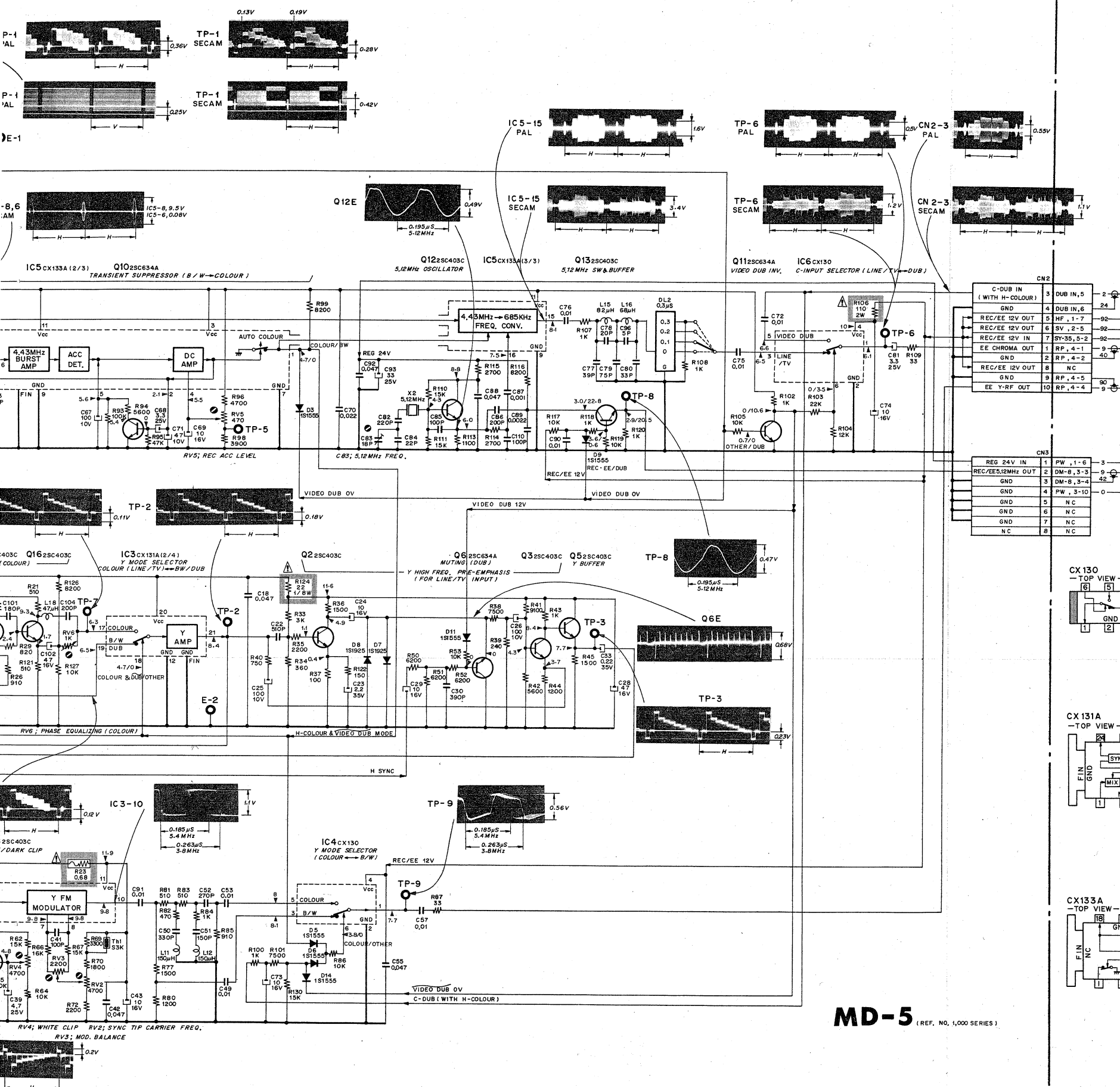
X2 D-1



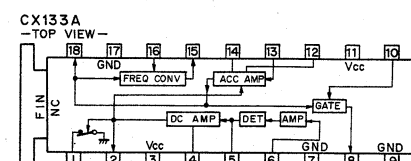
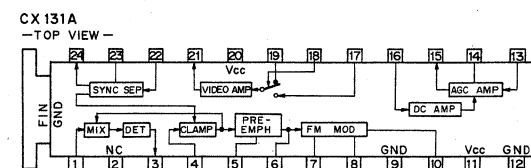
MD-5 - SOLDERING SIDE - (1,000 SERIES)







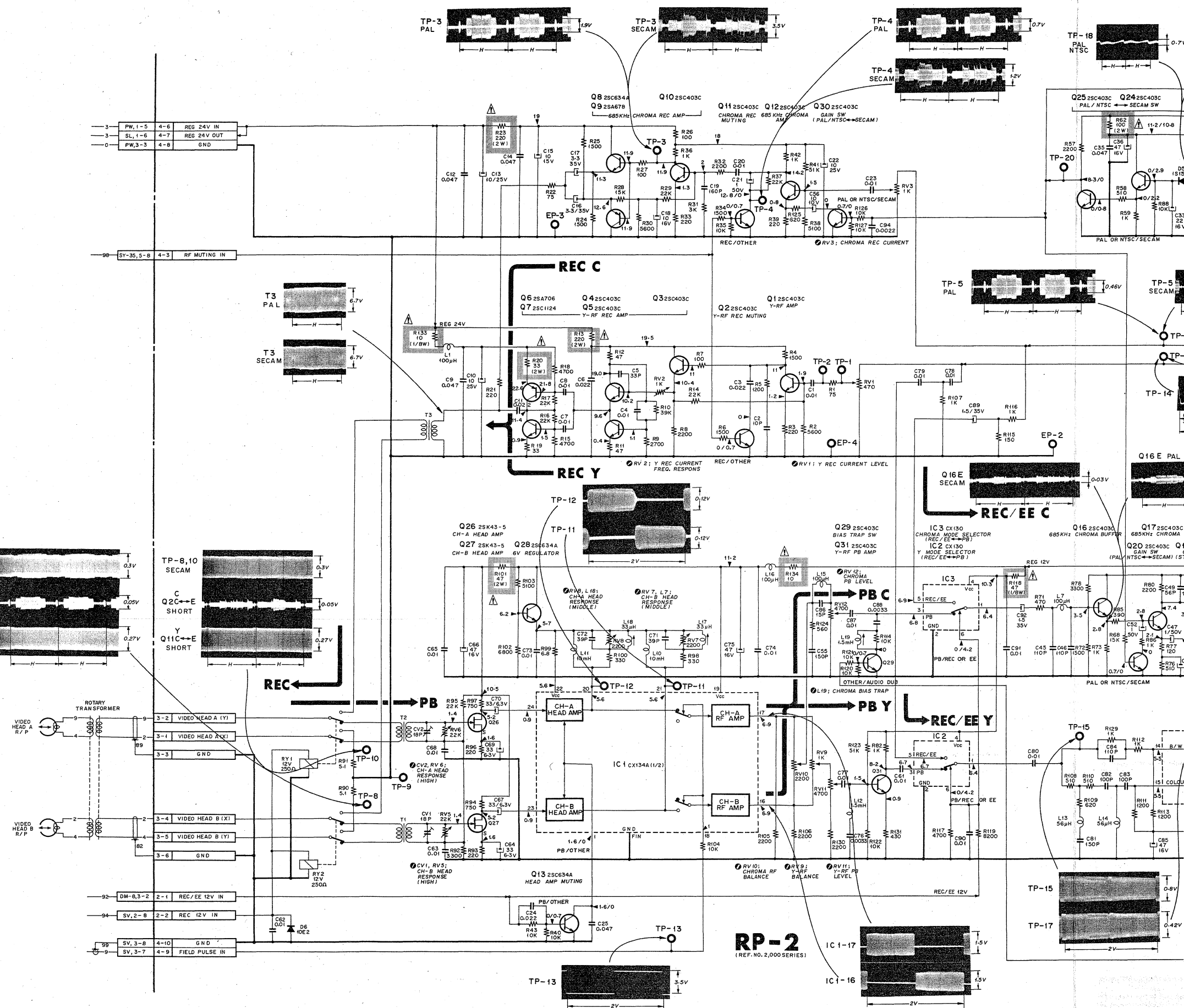
CONTROL A	SW
HIGH	NO
LOW OR OPEN	NO

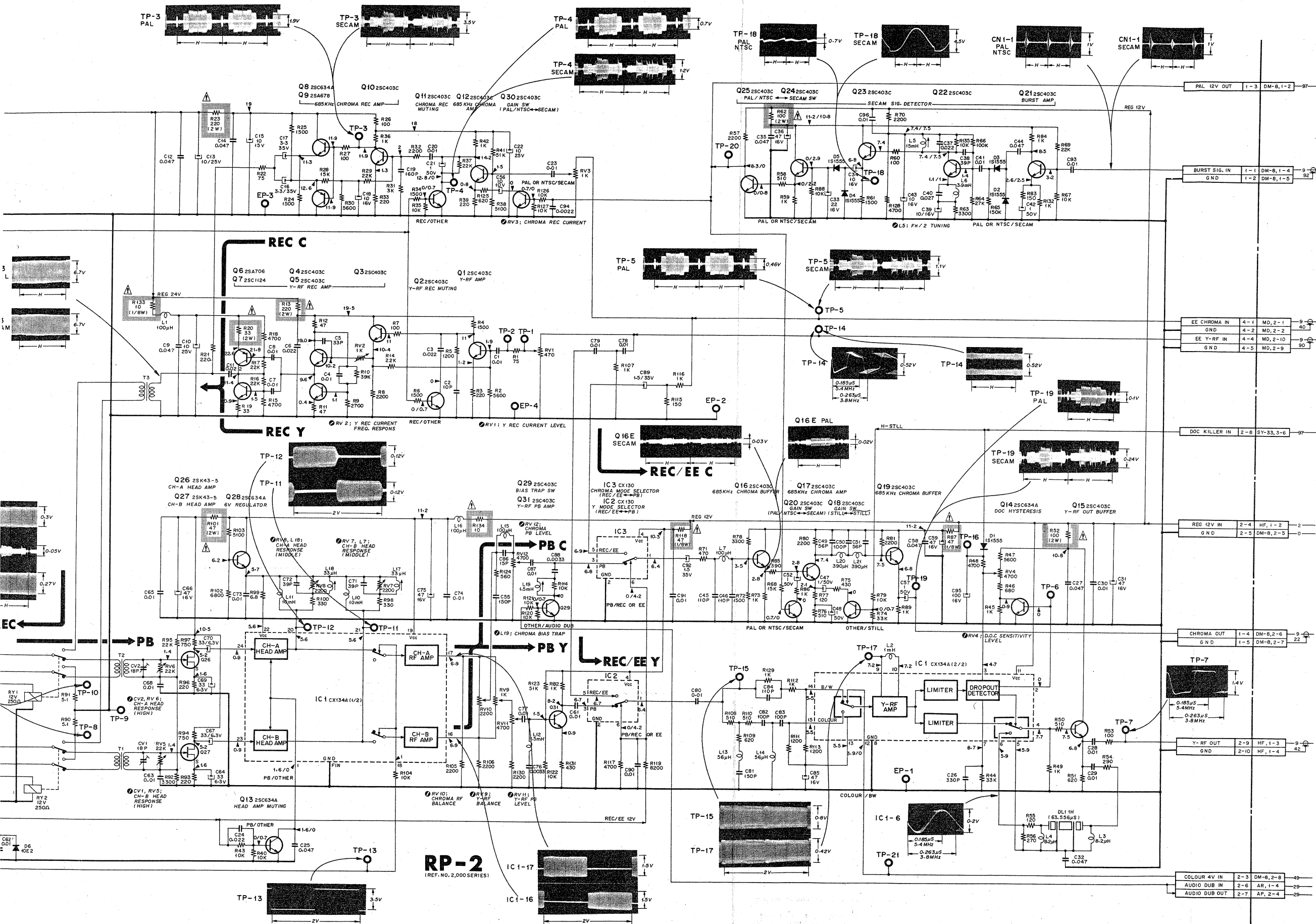


NOTE:

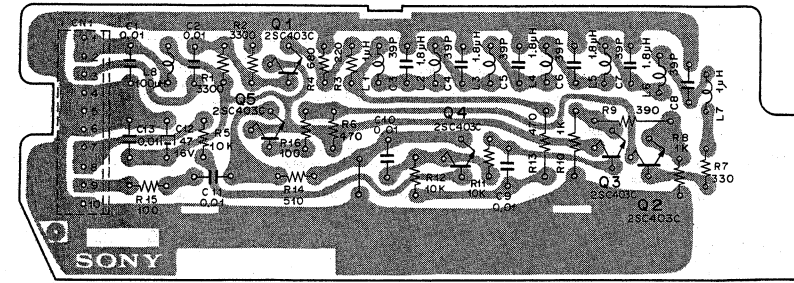
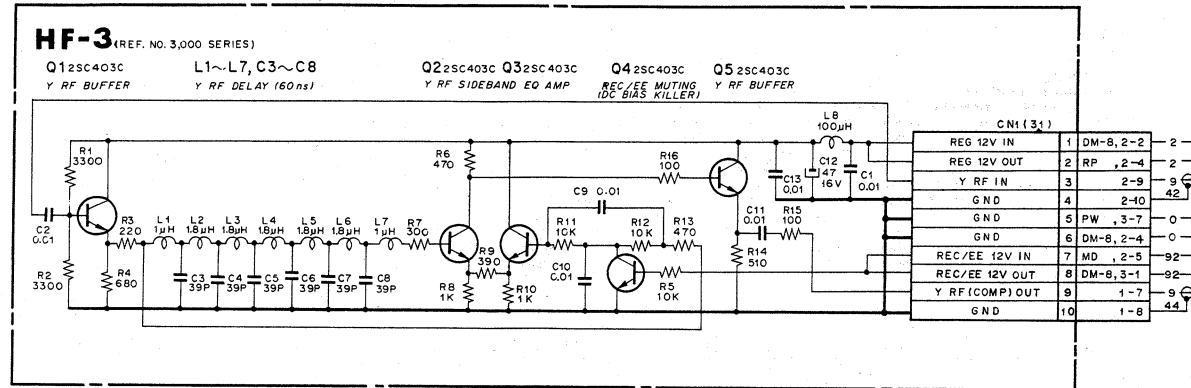
1. The shaded and -marked components are critical to safety.
Replace only with same components as specified.

RP-2(Y/C REC PB AMPLIFIER)



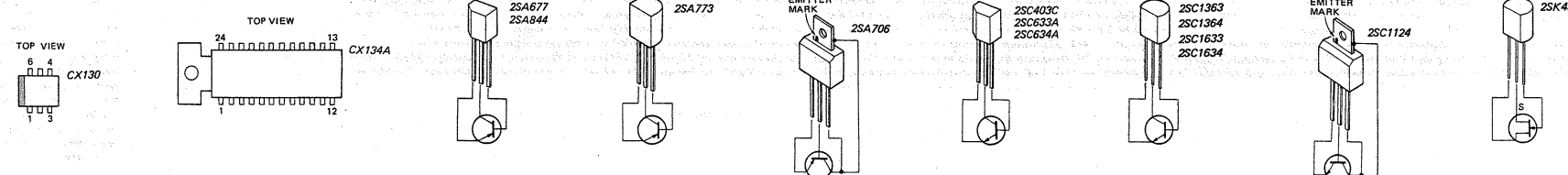
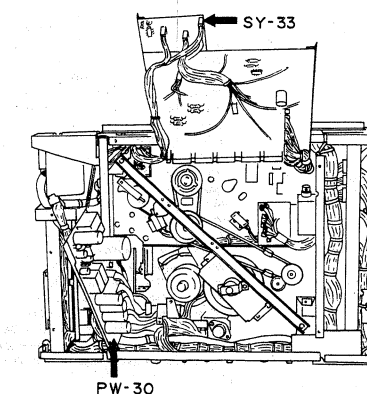
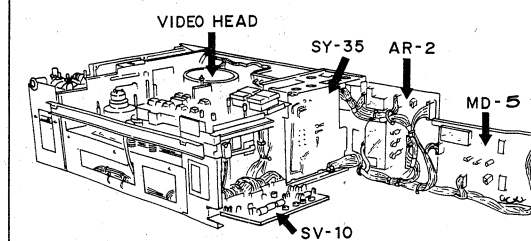
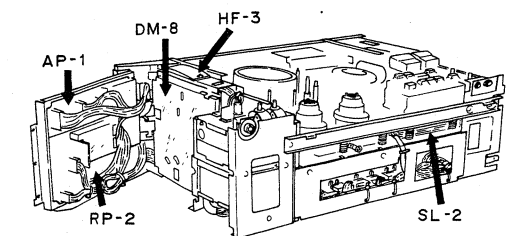
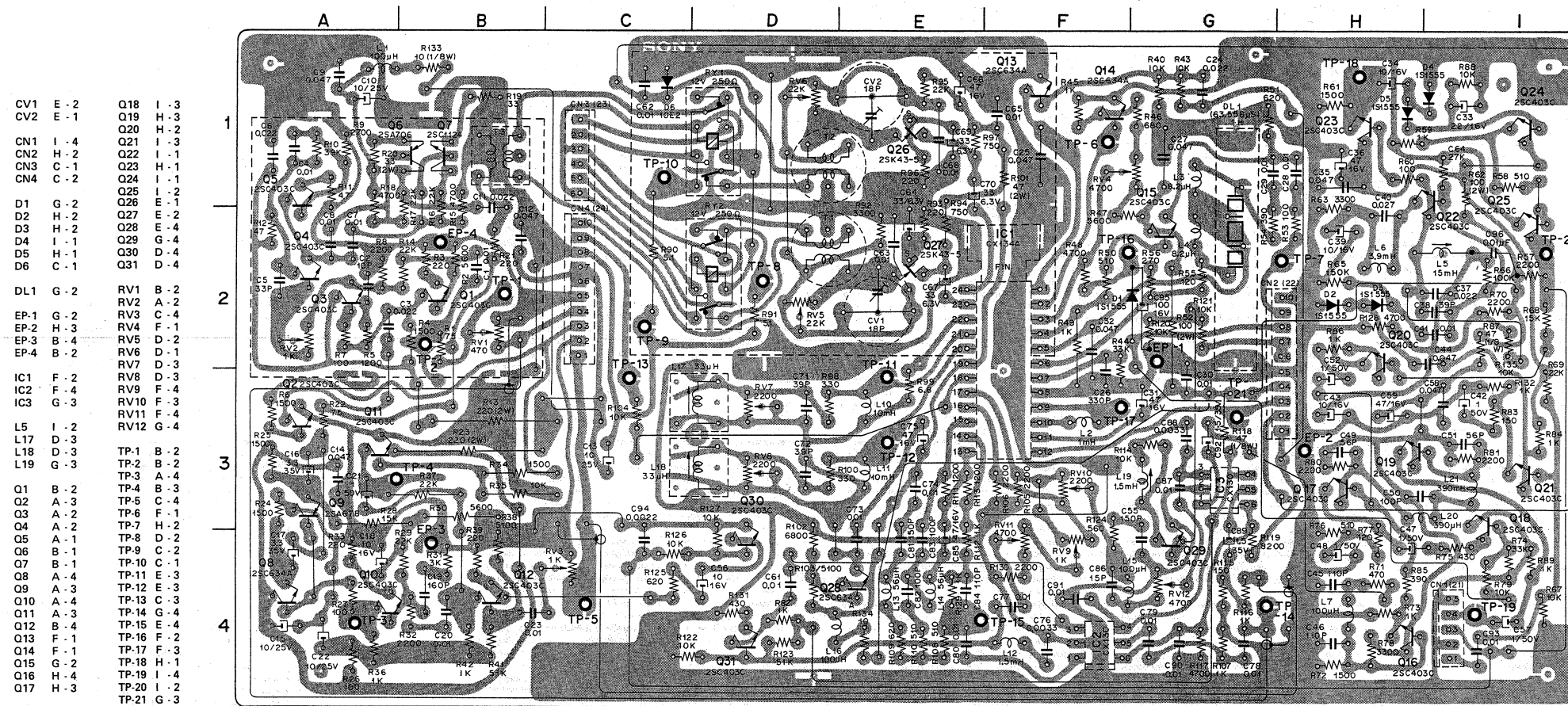


RP-2 (Y/C REC PB AMPLIFIER)
HF-3 (PB Y RF SIDEBAND EQ.)

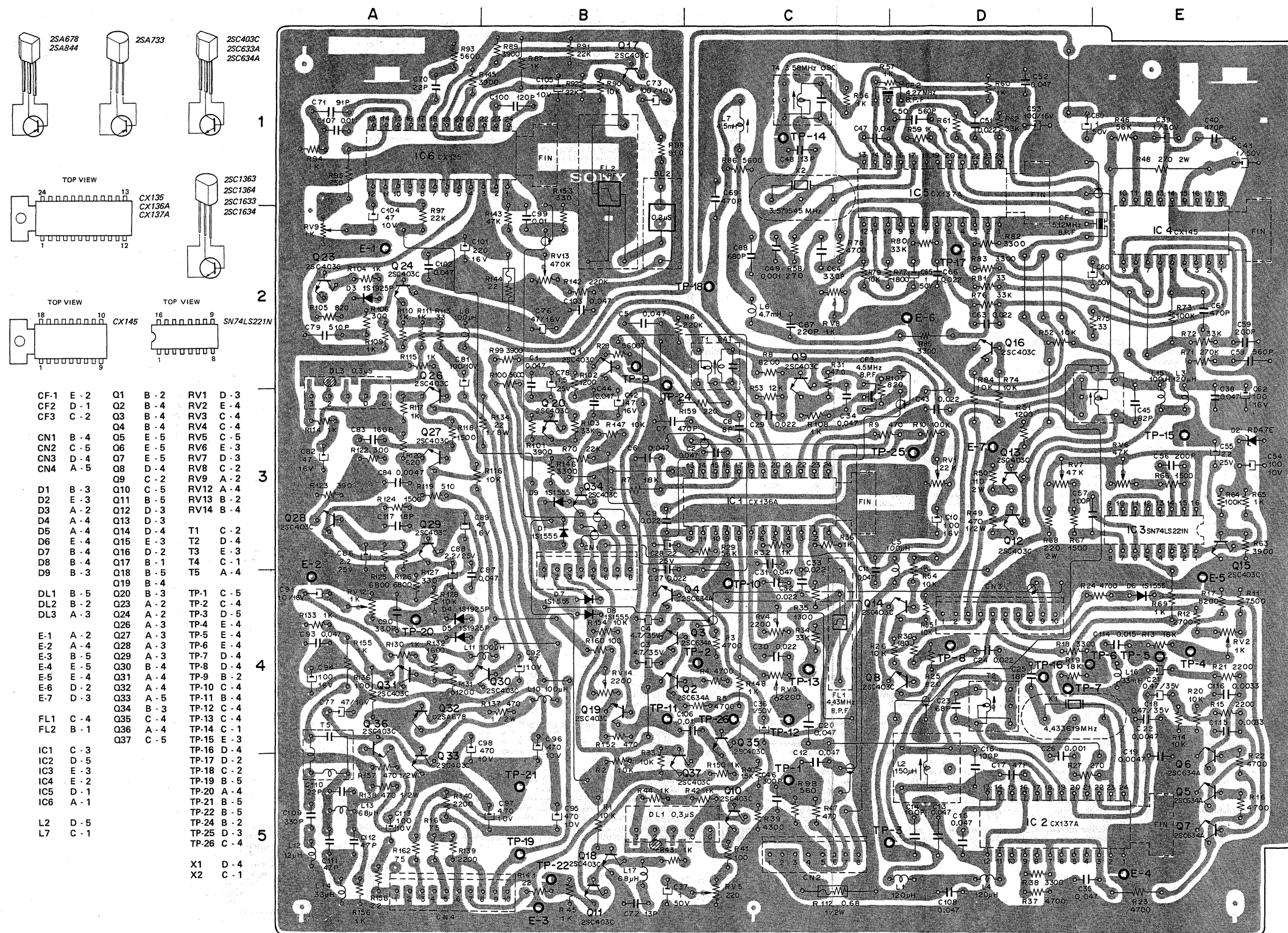


HF-3 -SOLDERING SIDE- (3,000 SERIES)

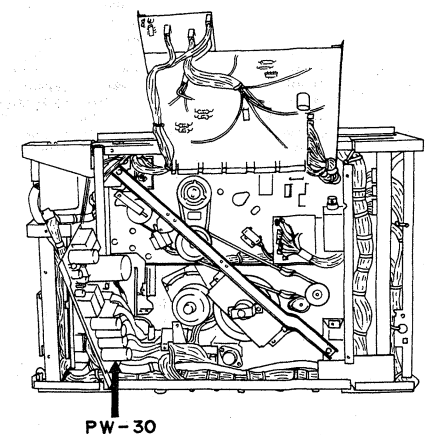
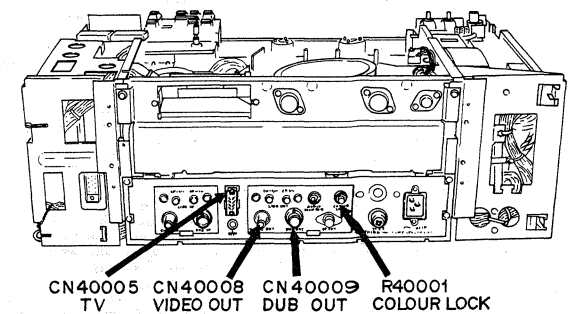
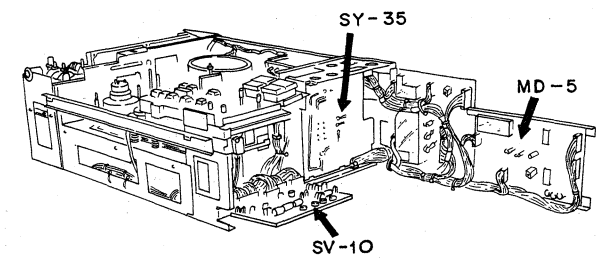
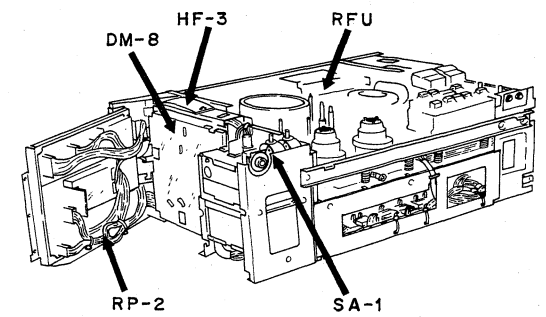
RP-2 -SOLDERING SIDE- (2,000 SERIES)

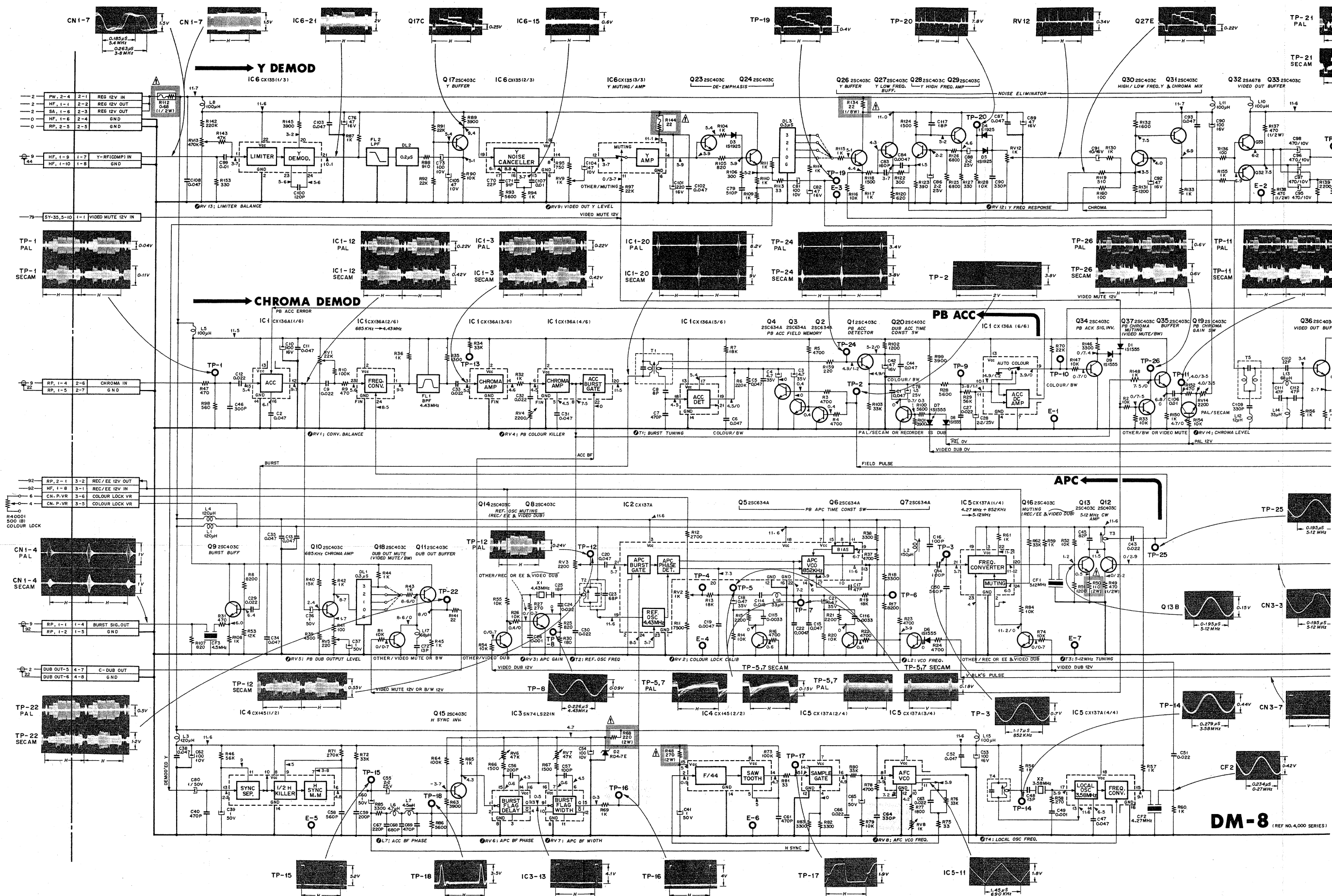


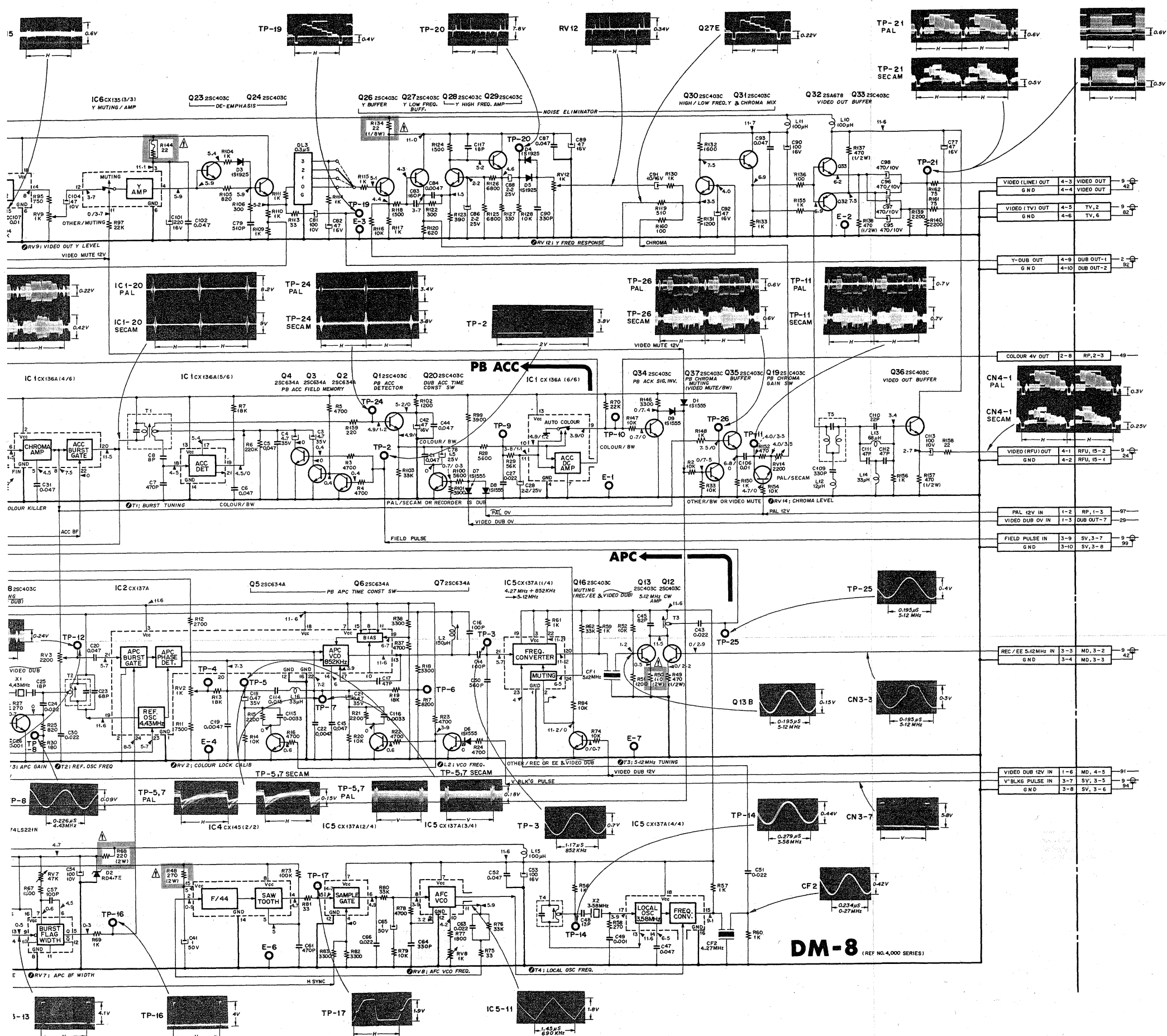
DM-8 (Y/C DEMODULATOR)



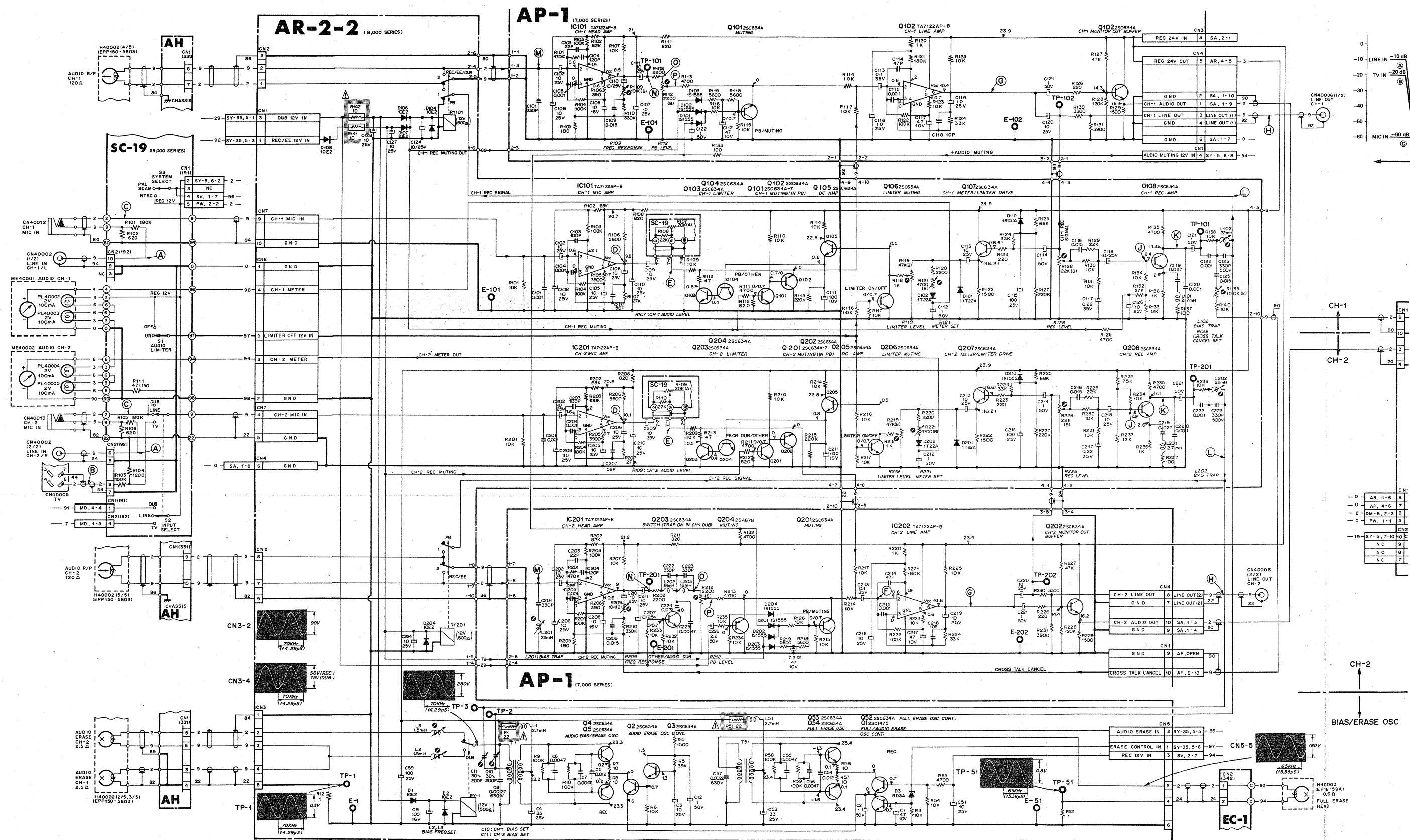
DM-8 - SOLDERING SIDE - (4,000 SERIES)

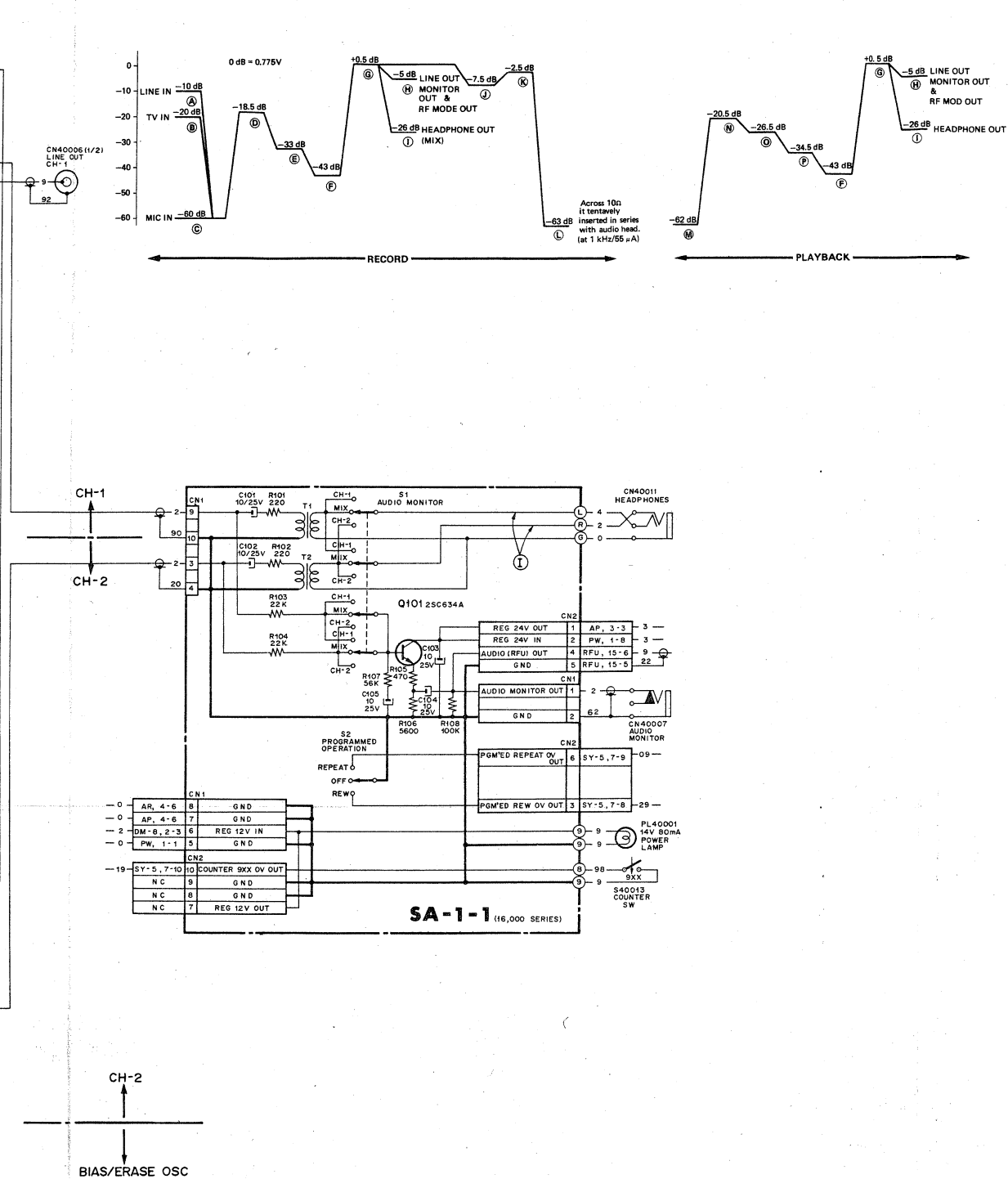






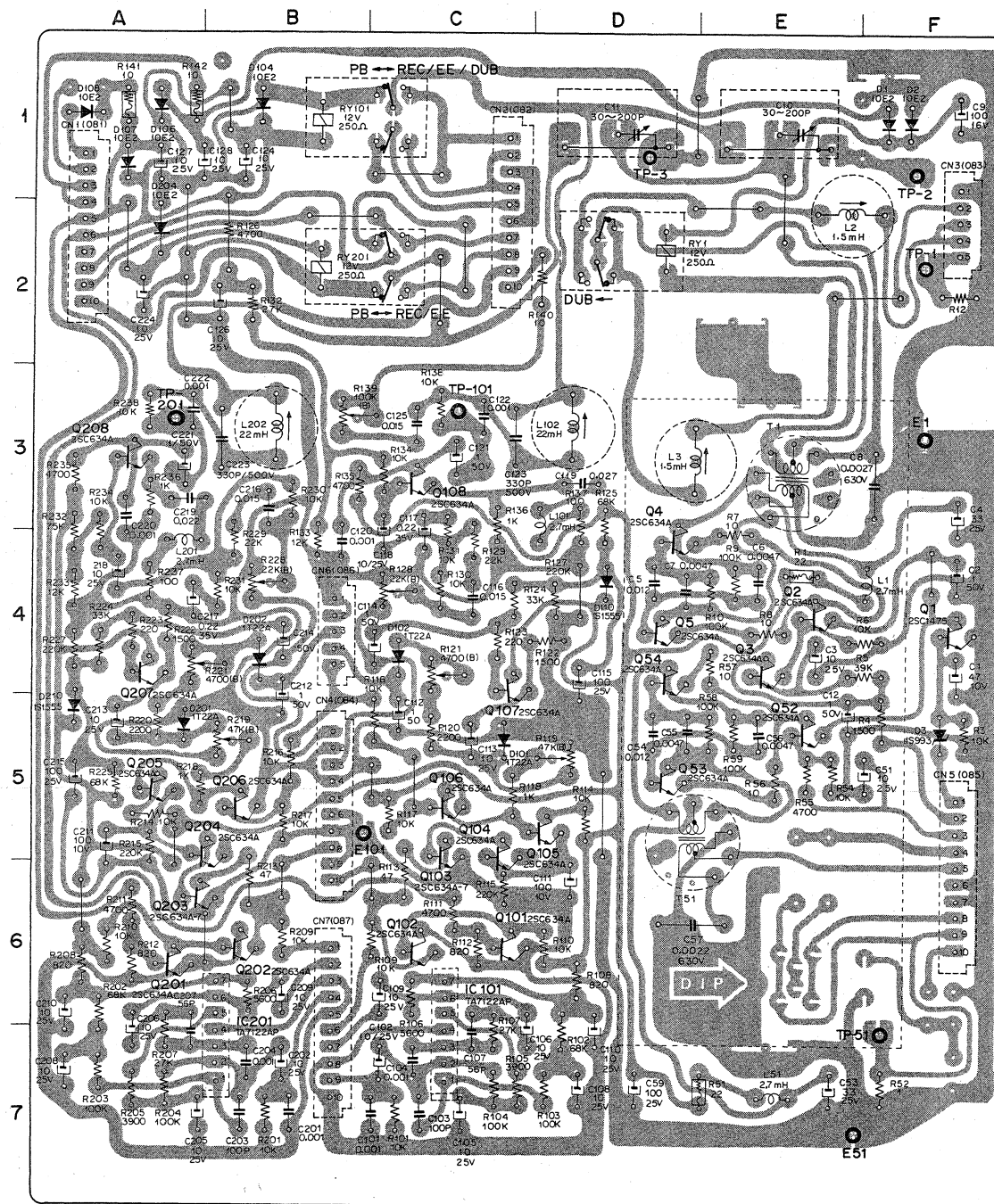
AP-1 (AUDIO PB AMPLIFIER)
AR-2-2 (AUDIO REC AMPLIFIER)
(BIAS/ERASE OSCILLATOR)
SA-1-1 (SYSTEM/AUDIO SELECTOR)





1. The shaded and  -marked components are critical to safety.
Replace only with same component as specified.

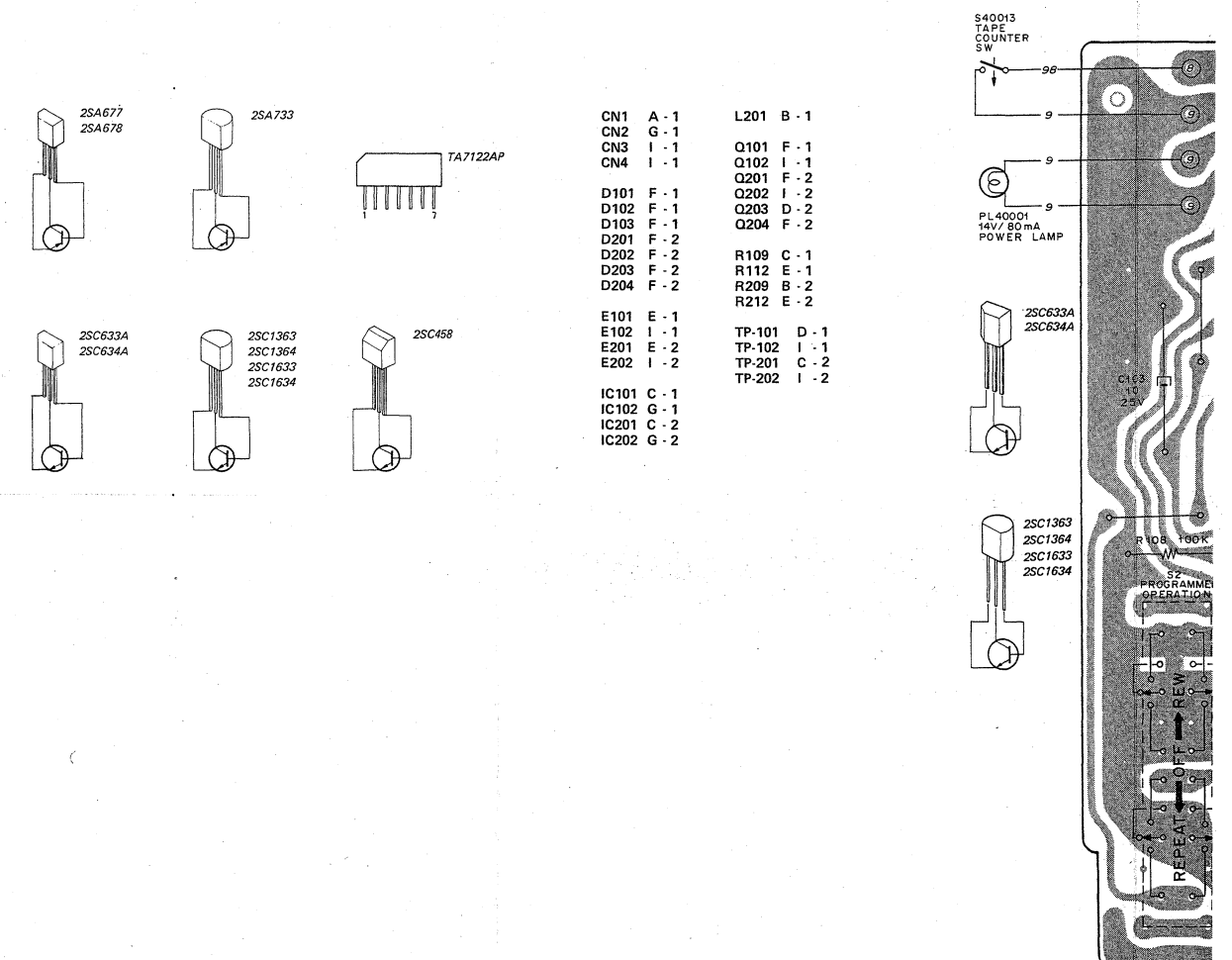
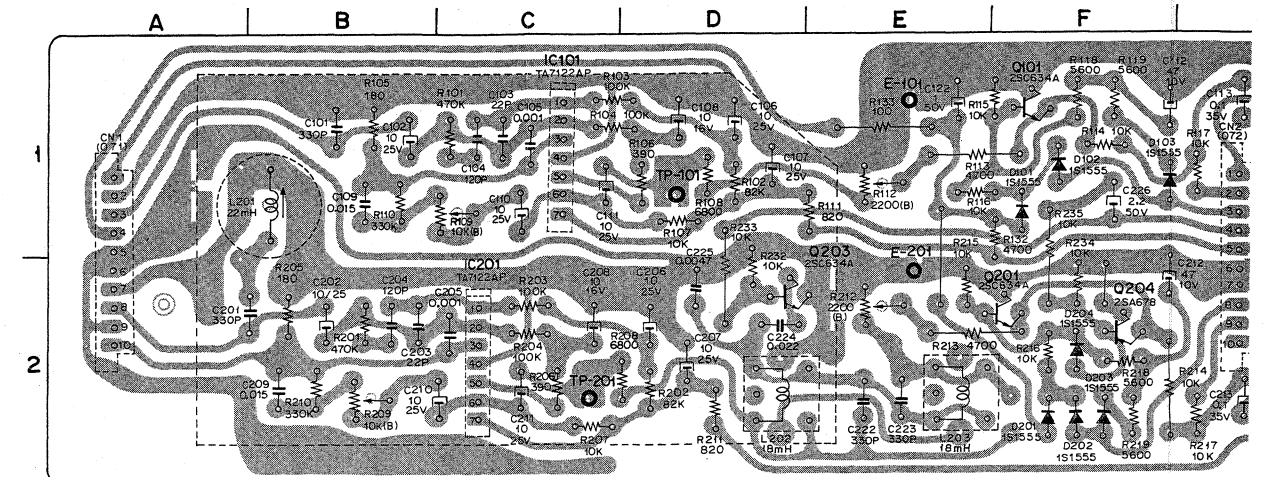
AR-2-2 (AUDIO REC AMPLIFIER)
(BIAS/ERASE OSCILLATOR)



AR-2-2 - SOLDERING SIDE - (8,000 SERIES)

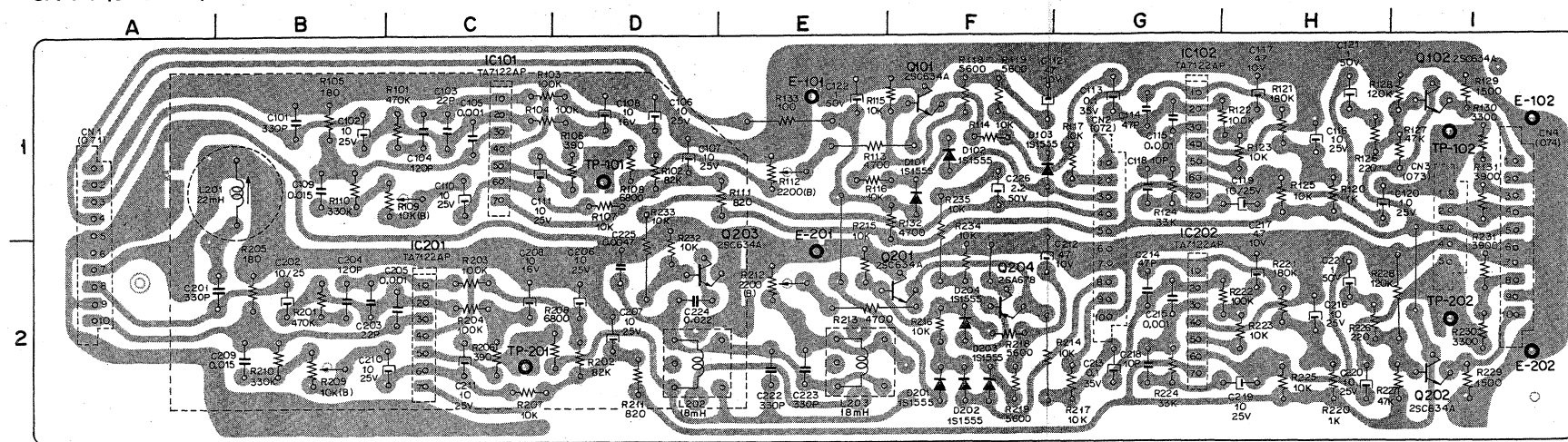
C10	E - 1	L2	E - 2	R119	D - 5
C11	D - 1	L3	D - 3	R121	C - 4
		L102	D - 3	R128	C - 4
CN1	A - 1	L202	B - 4	R139	B - 3
CN2	C - 1			R219	B - 5
CN3	F - 2	Q1	F - 3	R221	A - 4
CN4	B - 5	Q2	E - 4	R228	B - 4
CN5	F - 6	Q3	E - 4		
CN6	B - 4	Q4	D - 4	RY1	D - 2
CN7	B - 6	Q5	D - 4	RY101	B - 1
		Q52	E - 5	RY201	B - 2
D1	F - 1	Q53	D - 5		
D2	F - 1	Q54	D - 4	TP-1	F - 2
D3	F - 5	Q101	C - 6	TP-2	F - 1
D101	C - 5	Q102	C - 6	TP-3	D - 1
D102	C - 4	Q103	C - 6	TP-5	F - 7
D104	B - 1	Q104	C - 5	TP-101	C - 3
D106	A - 1	Q105	D - 5	TP-201	A - 3
D107	A - 1	Q106	C - 5		
D108	A - 1	Q107	C - 4		
D110	D - 4	Q108	C - 3		
D201	A - 5	Q201	A - 6		
D202	B - 4	Q202	B - 6		
D204	A - 2	Q203	A - 6		
D210	A - 5	Q204	B - 5		
		Q205	A - 5		
E-1	F - 3	Q206	B - 5		
E-51	F - 7	Q207	A - 4		
E-101	C - 5	Q208	A - 3		
IC101	C - 6				
IC201	B - 6				

AP-1 (AUDIO PB AMPLIFIER)
SA-1-1 (SYSTEM/AUDIO SELECTOR)

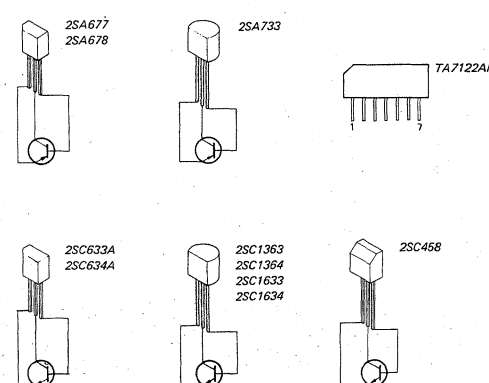


6A-1.

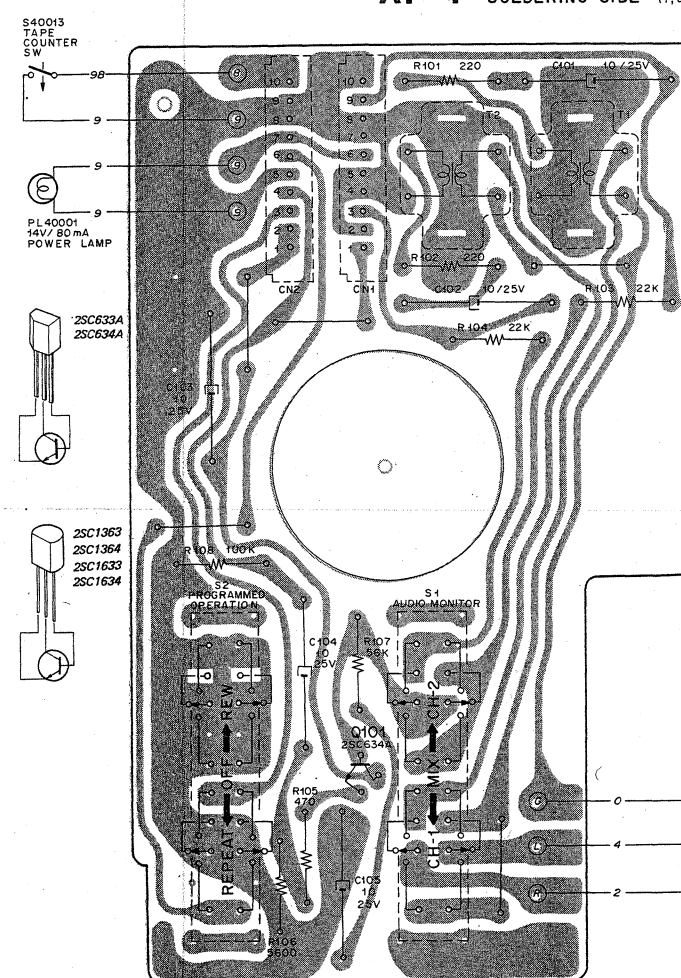
AP-1 (AUDIO PB AMPLIFIER)
SA-1-1 (SYSTEM/AUDIO SELECTOR)



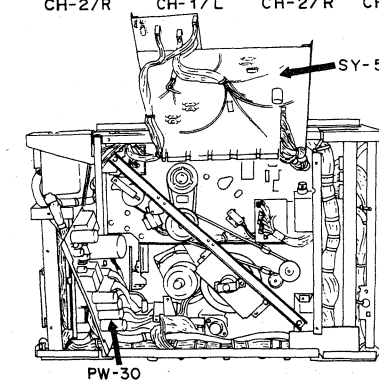
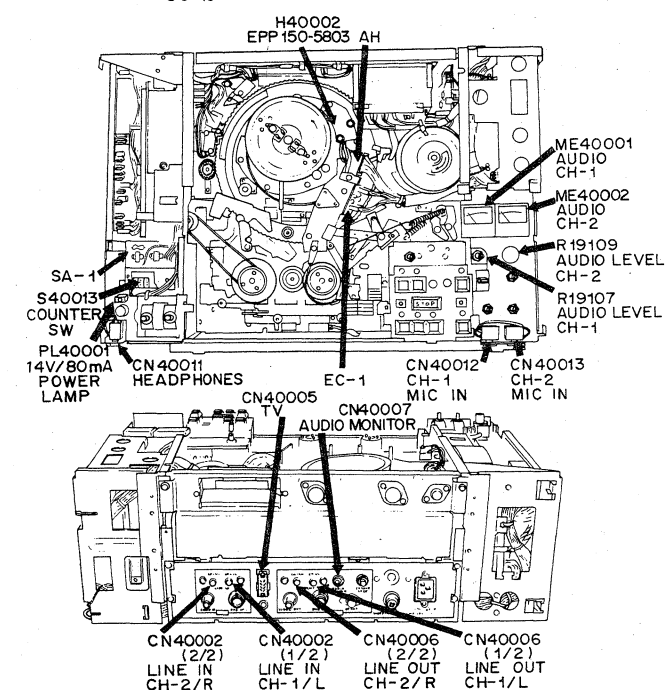
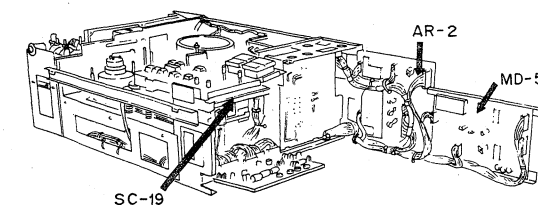
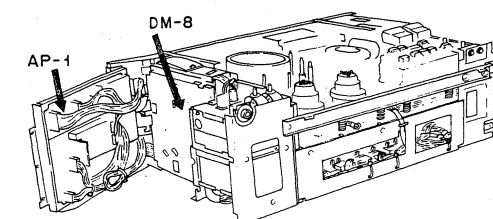
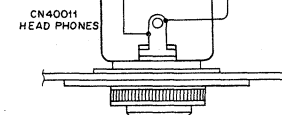
AP-1 - SOLDERING SIDE - (7,000 SERIES)



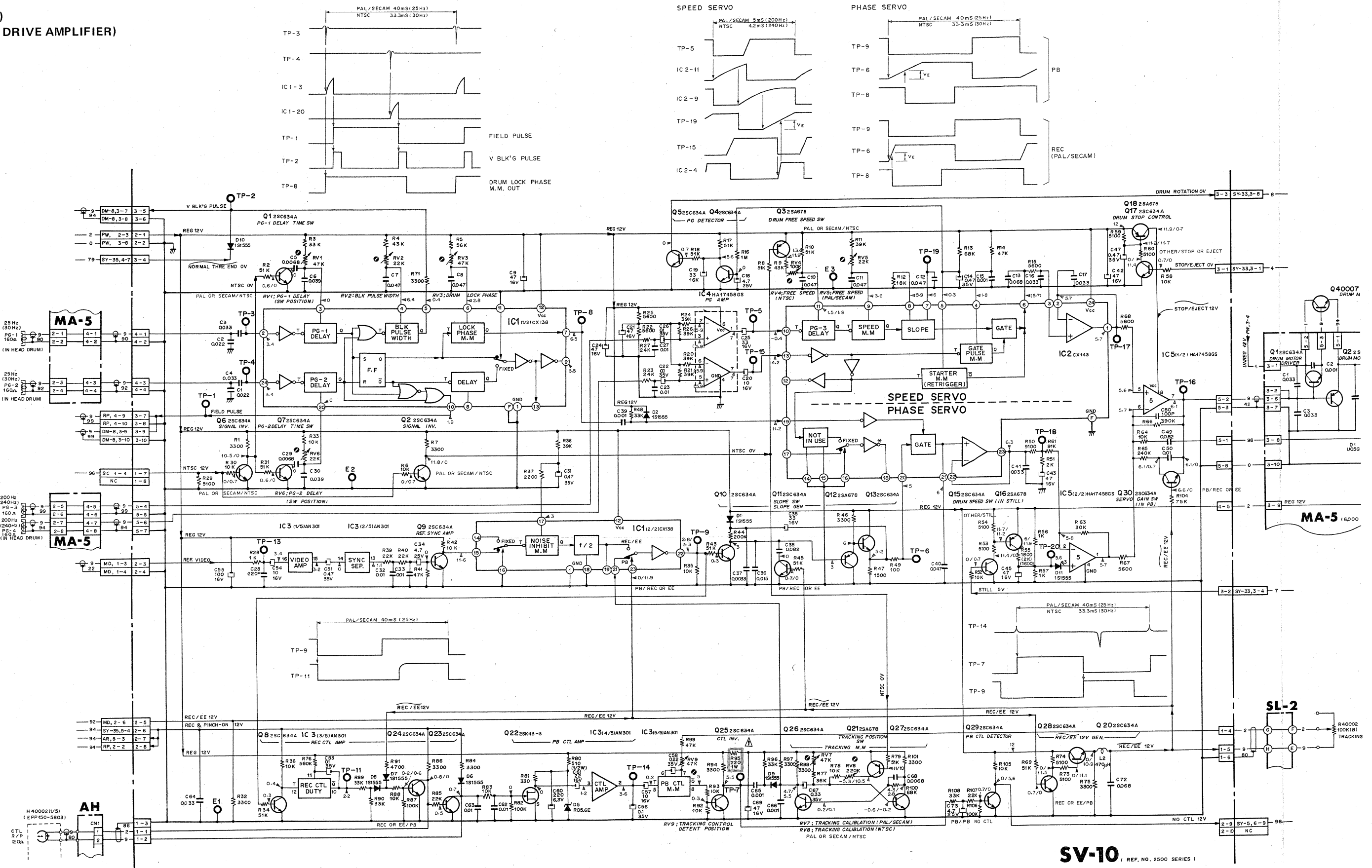
CN1 A - 1	L201 B - 1
CN2 G - 1	Q101 F - 1
CN3 I - 1	Q102 I - 1
CN4 I - 1	Q201 F - 2
D101 F - 1	Q202 I - 2
D102 F - 1	Q203 D - 2
D103 F - 1	Q204 F - 2
D201 F - 2	R109 C - 1
D202 F - 2	R112 E - 1
D203 F - 2	R209 B - 2
D204 F - 2	R212 E - 2
E101 E - 1	TP-101 D - 1
E102 I - 1	TP-102 I - 1
E201 E - 2	TP-201 C - 2
E202 I - 2	TP-202 I - 2
IC101 C - 1	
IC102 G - 1	
IC201 C - 2	
IC202 G - 2	



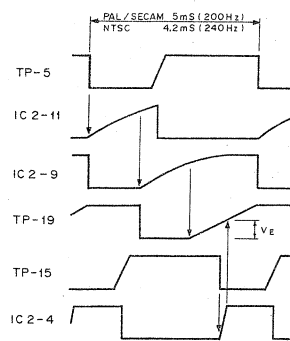
SA-1-1 - SOLDERING SIDE - (16,000 SERIES)



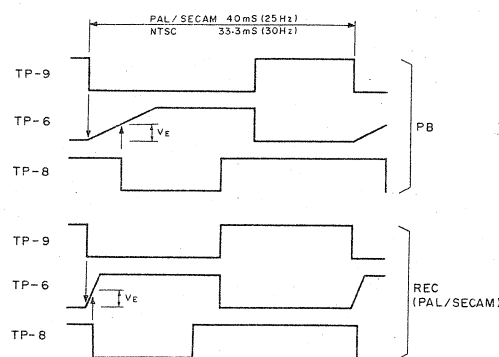
2 E - 2	R119 D - 5
3 D - 3	R121 C - 4
102 D - 3	R128 C - 4
202 B - 3	R139 B - 3
	R219 B - 5
1 F - 4	R221 A - 4
2 E - 4	R228 B - 4
3 E - 4	
4 D - 4	RY1 D - 2
5 D - 4	RY101 B - 1
52 E - 5	RY201 B - 2
53 D - 5	
54 D - 4	TP-1 F - 2
101 C - 6	TP-2 F - 1
102 C - 6	TP-3 D - 1
103 C - 5	TP-51 F - 7
104 C - 5	TP-101 C - 3
105 D - 5	TP-201 A - 3
106 C - 5	
107 C - 4	
108 C - 3	
201 A - 6	
202 B - 6	
203 A - 6	
204 B - 5	
205 A - 5	
206 B - 5	
207 A - 4	
208 A - 3	

SV-10 (SERVO)
MA-5 (MOTOR DRIVE AMPLIFIER)

SPEED SERVO

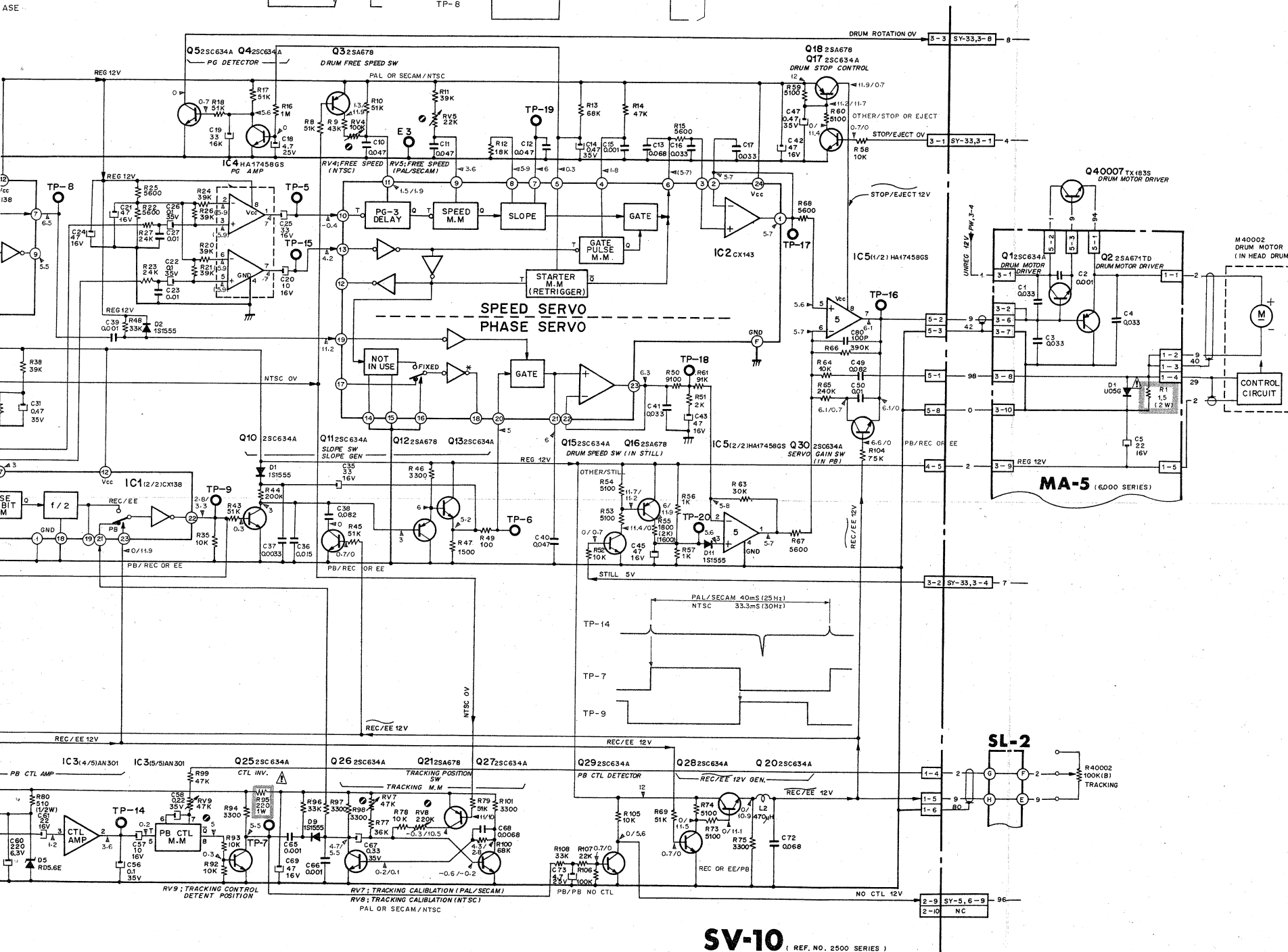


PHASE SERVO

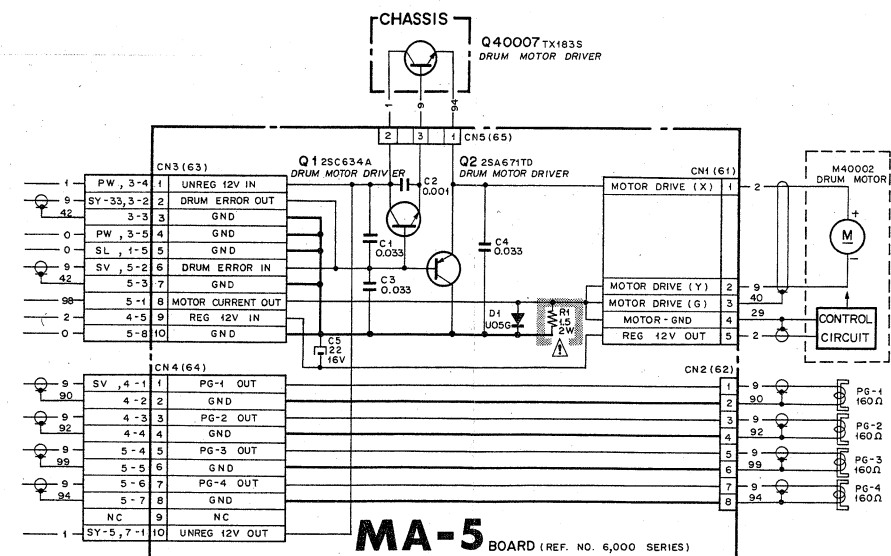


NOTE:

- The shaded and Δ -marked components are critical to safety. Replace only with same components as specified.



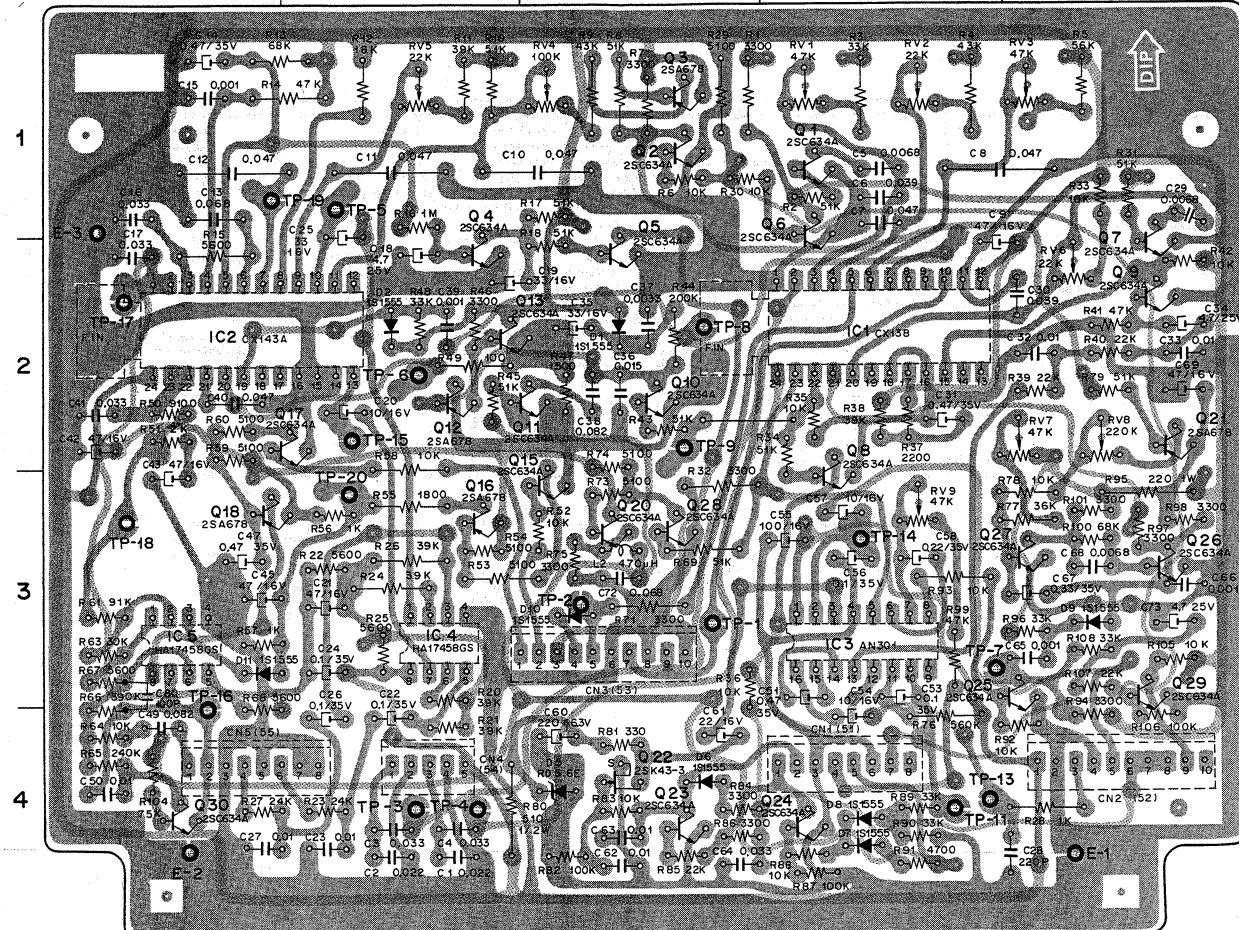
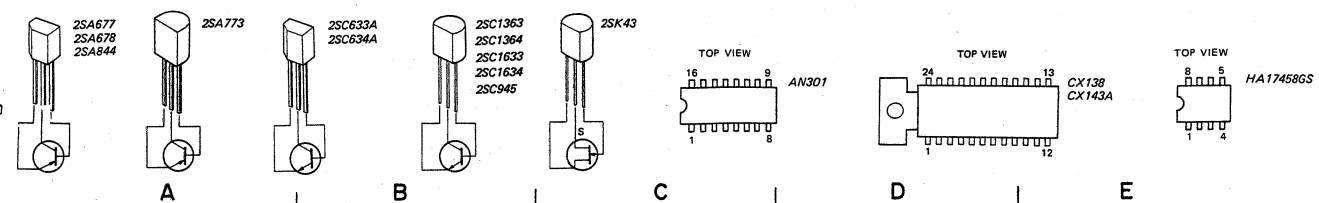
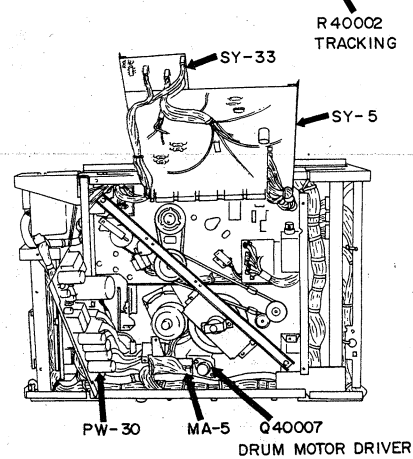
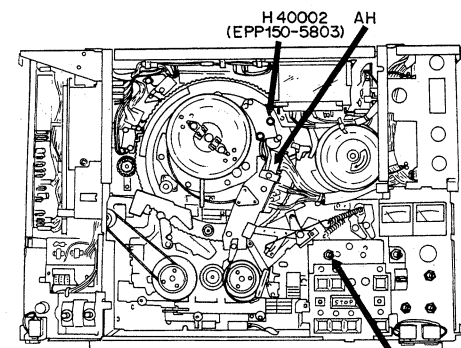
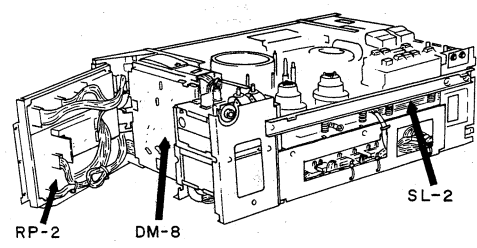
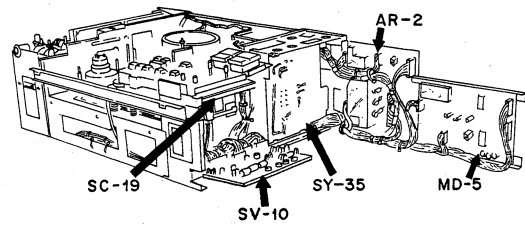
SV-10 (REF. NO. 2500 SERIES)



MA-5 BOARD (REF. NO. 6000 SERIES)

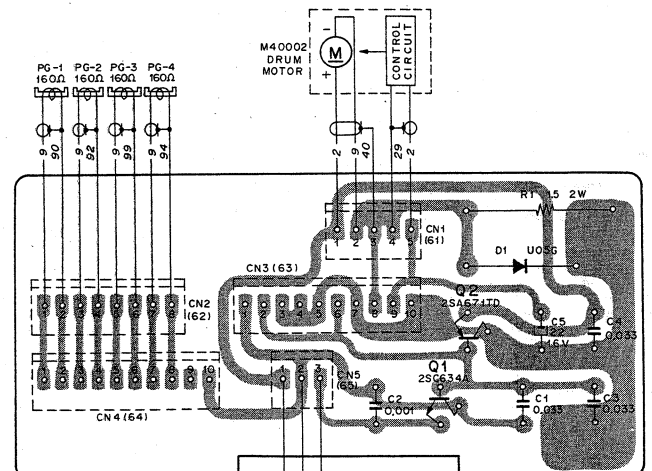
SV-10 (SERVO)
MA-5 (MOTOR DRIVE AMPLIFIER)

SV-10/MA-5 SV-10/MA-5

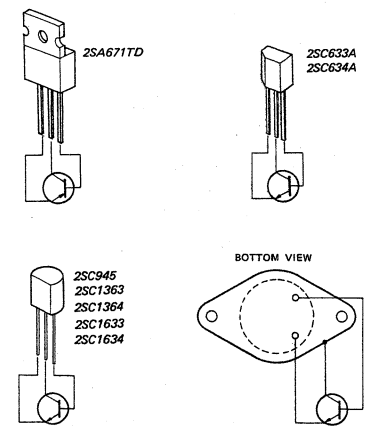


CN1	D-4	RV1	D-1
CN2	E-4	RV2	D-1
CN3	C-3	RV3	E-1
CN4	B-4	RV4	C-1
CN5	A-4	RV5	B-1
		RV6	E-2
		RV7	E-2
		RV8	E-2
		RV9	D-3
D1	C-2	TP-1	C-3
D2	B-2	TP-2	C-3
D5	C-4	TP-3	B-4
D6	C-4	TP-4	B-4
D7	D-4	TP-5	B-1
D8	D-4	TP-6	B-2
D9	E-3	TP-7	D-3
D10	C-3	TP-8	C-2
D11	A-3	TP-9	C-2
		TP-11	D-4
		TP-13	D-4
		TP-14	D-3
		TP-15	B-2
		TP-16	A-3
		TP-17	A-2
		TP-18	A-3
		TP-19	A-1
		TP-20	B-3
E-1	E-4		
E-2	A-4		
E-3	A-1		
IC1	D-2		
IC2	A-2		
IC3	D-3		
IC4	B-3		
IC5	A-3		
Q1	D-1		
Q2	C-1		
Q3	C-1		
Q4	B-2		
Q5	C-2		
Q6	D-1		
Q7	E-2		
Q8	D-3		
Q9	E-2		
Q10	C-2		
Q11	C-2		
Q12	B-2		
Q13	B-2		
Q15	C-3		
Q16	B-3		
Q17	B-2		
Q18	A-3		
Q20	C-3		
Q21	E-2		
Q22	C-4		
Q23	C-4		
Q24	D-4		
Q25	E-3		
Q26	E-3		
Q27	E-3		
Q28	C-3		
Q29	E-3		
Q30	A-4		

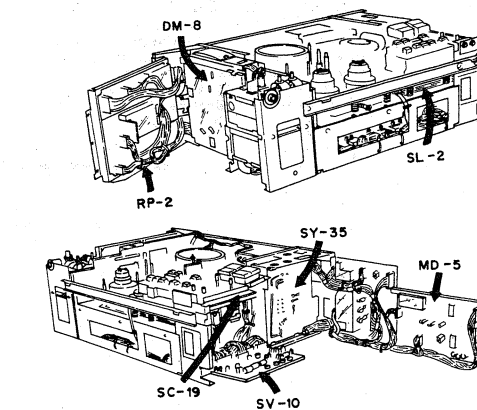
SV-10 -SOLDERING SIDE- (6,000 SERIES)



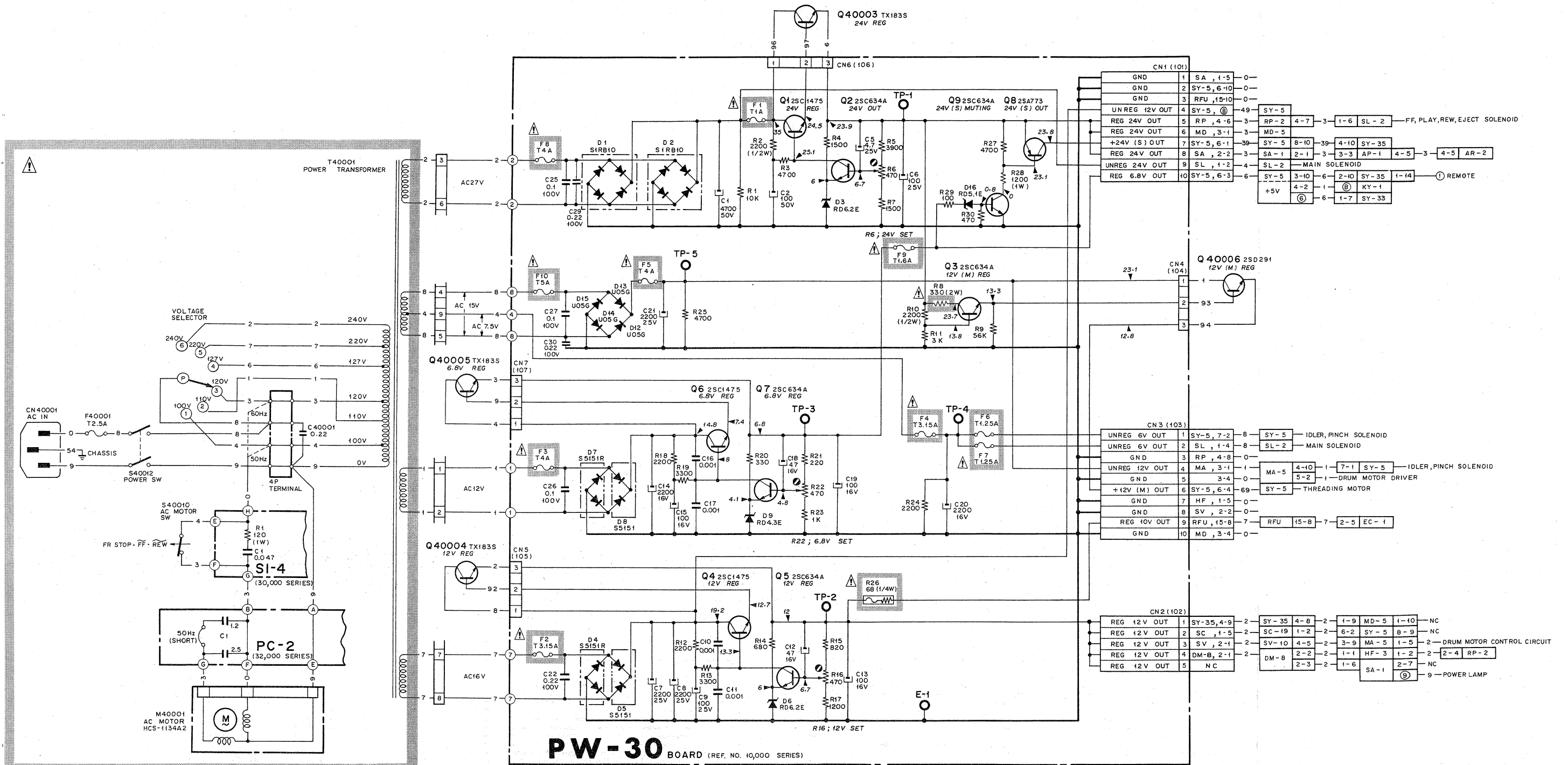
MA-5 -SOLDERING SIDE- (6,000 SERIES)



PW-30/PC-2/SI-4



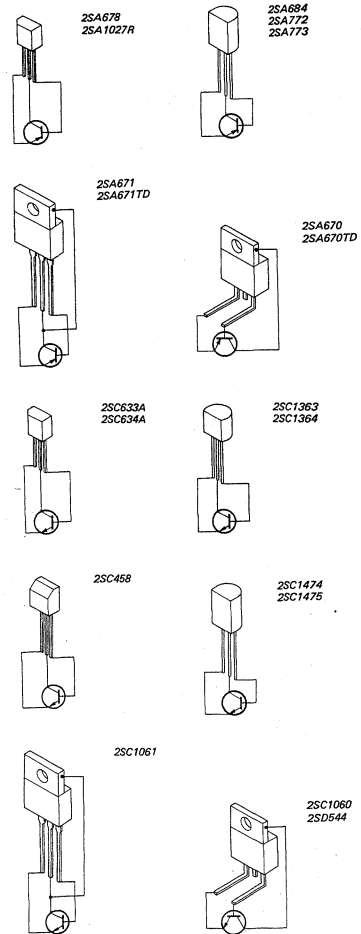
PW-30 (POWER SUPPLY)



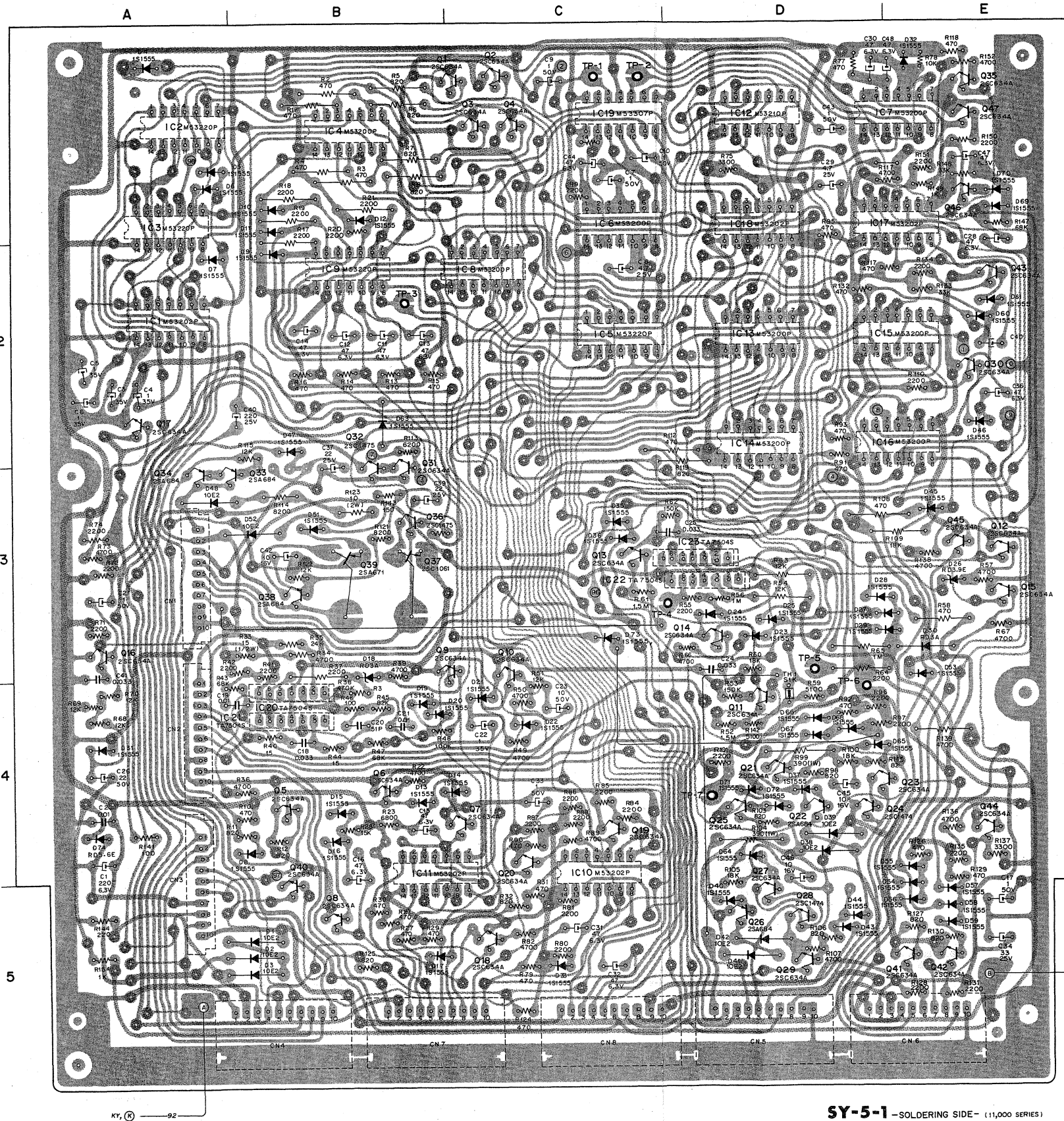
SY-5-1

SY-5-1

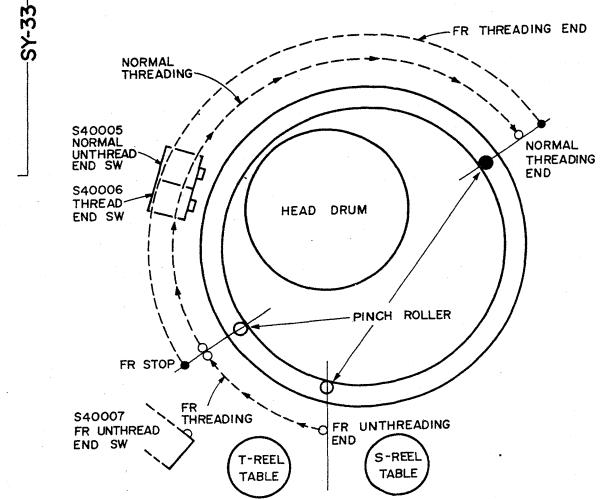
SY-5-1 (MECHANICAL SYSTEM CONTROL)



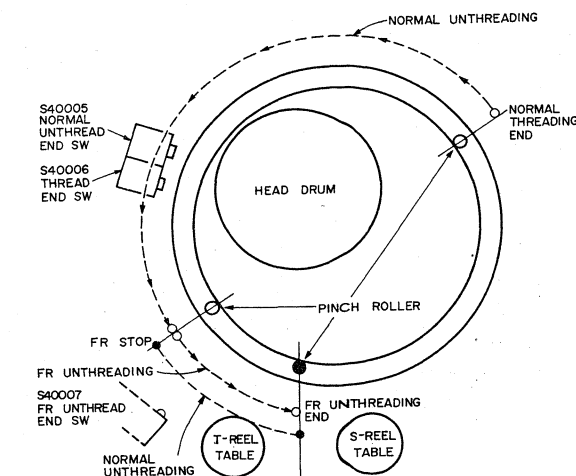
D1 B-5	D54 E-5	O7 C-4
D2 B-5	D55 E-4	O8 B-5
D3 B-5	D56 E-5	O9 B-3
D4 A-1	D57 E-5	O10 C-3
D5 A-1	D58 E-5	O11 D-4
D6 A-1	D59 E-5	O12 E-3
D7 A-2	D60 E-2	O13 C-3
D8 B-4	D61 E-2	O14 D-3
D9 B-2	D62 B-2	O15 E-3
D10 B-1	D63 B-2	O16 A-3
D11 B-1	D64 D-4	O17 A-2
D12 B-1	D65 D-4	O18 C-5
D13 B-4	D66 D-4	O19 C-4
D14 B-4	D67 D-4	O20 C-4
D15 B-4	D68 E-1	O21 D-4
D16 B-4	D69 E-1	O22 D-4
D17 B-4	D70 E-1	O23 D-4
D18 B-3	D71 D-4	O24 D-4
D19 B-4	D72 D-4	O25 D-4
D20 B-4	D73 C-3	O26 D-5
D21 C-4	D74 A-4	O27 D-5
D22 C-4	IC1 A-2	O28 D-5
D23 D-3	IC2 A-1	O29 D-5
D24 D-3	IC3 A-1	O30 E-2
D25 D-3	IC4 B-1	O31 B-3
D26 E-3	IC5 C-2	O32 B-3
D27 D-3	IC6 C-1	O33 A-3
D28 D-3	IC7 E-1	O34 A-3
D29 D-3	IC8 C-2	O35 E-1
D30 E-3	IC9 B-2	O36 B-3
D31 A-4	IC10 C-4	O37 B-3
D32 E-1	IC11 B-4	O38 B-3
D33 C-5	IC12 D-1	O39 B-3
D34 C-3	IC13 D-2	O40 B-5
D35 C-3	IC14 D-2	O41 E-5
D36 C-3	IC15 E-2	O42 E-5
D37 D-4	IC16 E-2	O43 E-2
D38 D-4	IC17 E-1	O44 E-4
D39 D-4	IC18 D-1	O45 E-3
D40 D-4	IC19 C-1	O46 E-1
D41 D-5	IC20 B-4	O47 E-1
D42 D-5	IC21 B-4	
D43 D-5	IC22 D-3	
D44 D-5	IC23 D-3	
D45 E-3		
D46 E-2	Q1 C-1	TP-1 C-2
D47 B-3	Q2 C-1	TP-2 C-2
D48 A-3	Q3 C-1	TP-3 B-2
D51 B-3	Q4 C-1	TP-4 D-3
D52 B-3	Q5 B-4	TP-5 D-3
D53 E-3	Q6 B-4	TP-6 D-4
		TP-7 D-4



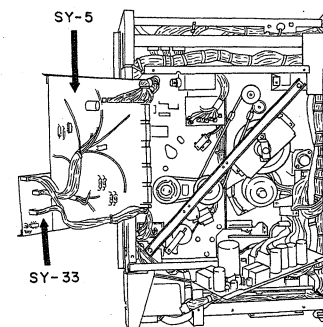
① (B-3)	7	1
② (E-2)	0	2
③ (D-3)	4	3
④ (E-2)	8	4
⑤ (E-2)	9	5
⑥ (C-2)	6	6
⑦ (B-3)	3	7
⑧ (E-2)	1	8
⑨ (C-1)	2	9
⑩ (C-1)	2	10



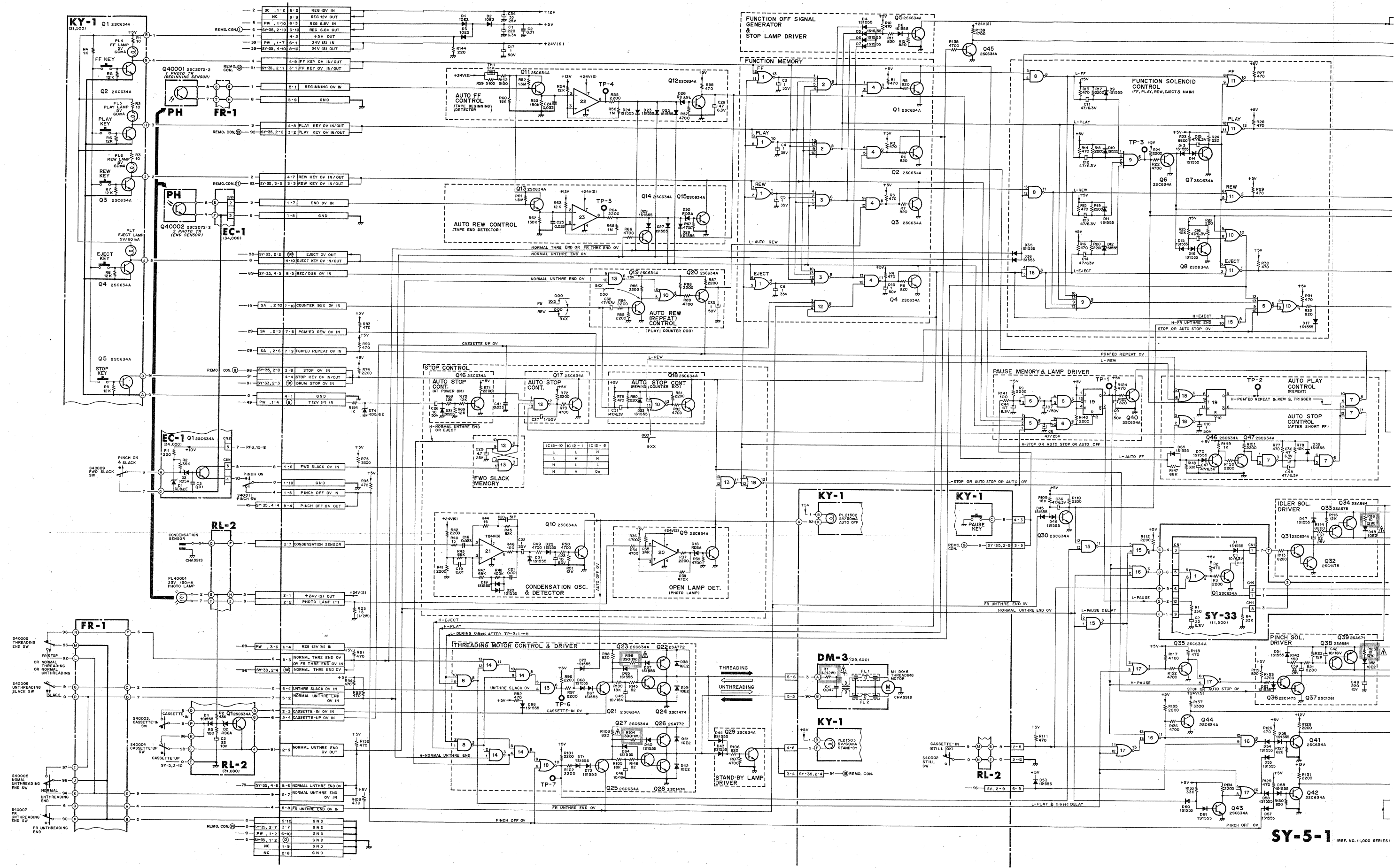
THREADING MODE

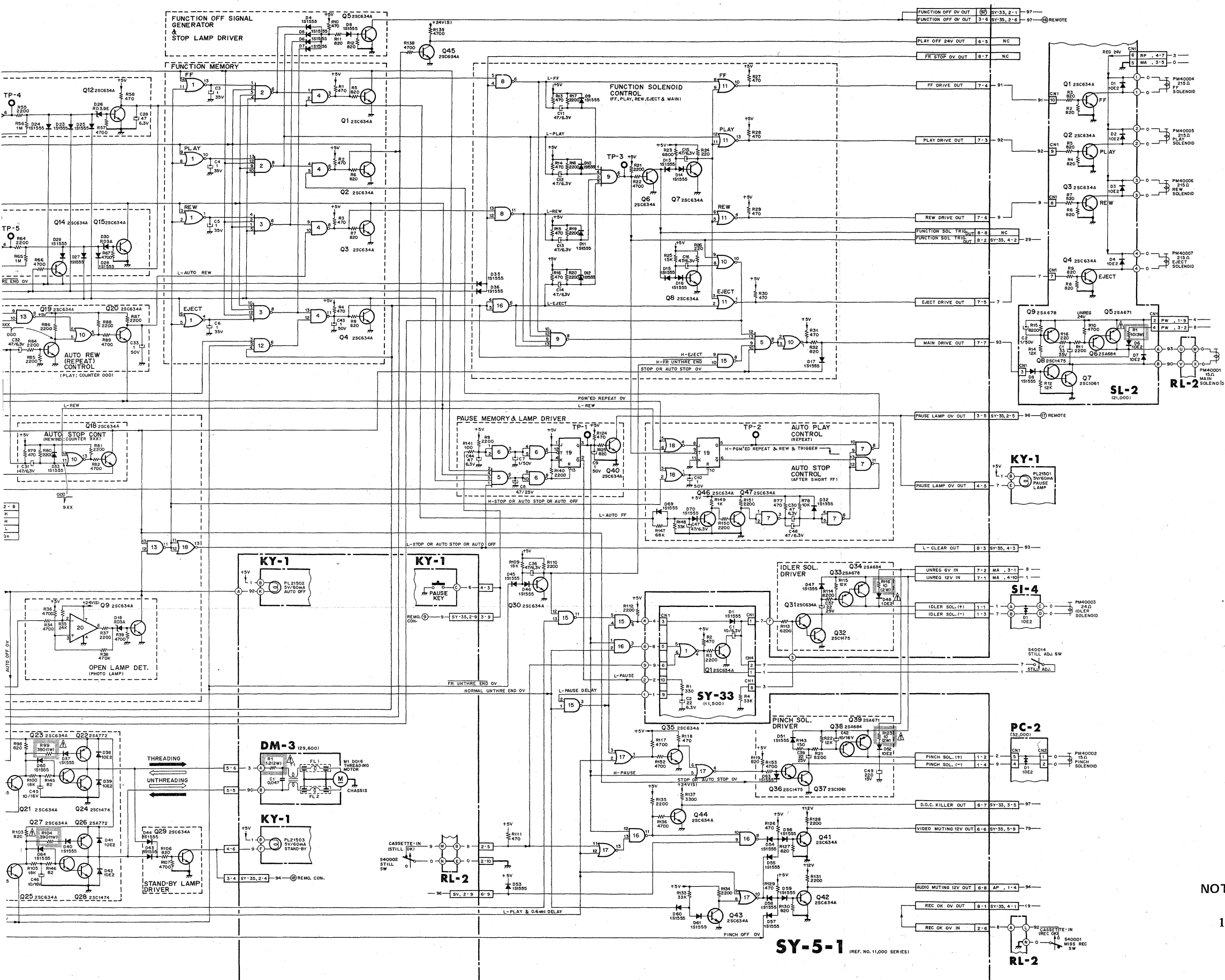


UNTHREADING MODE



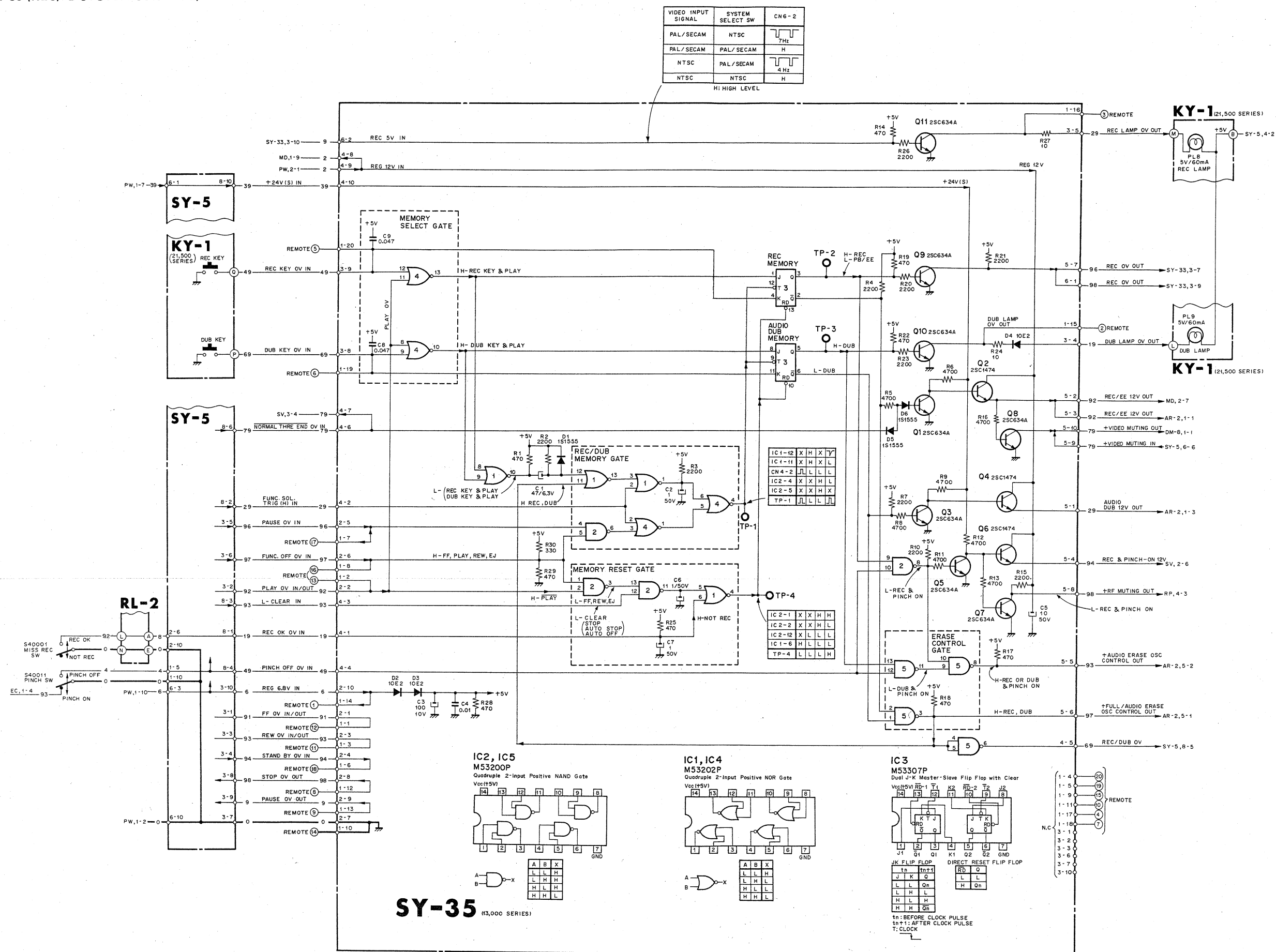
SY-5-1 - SOLDERING SIDE - (11,000 SERIES)





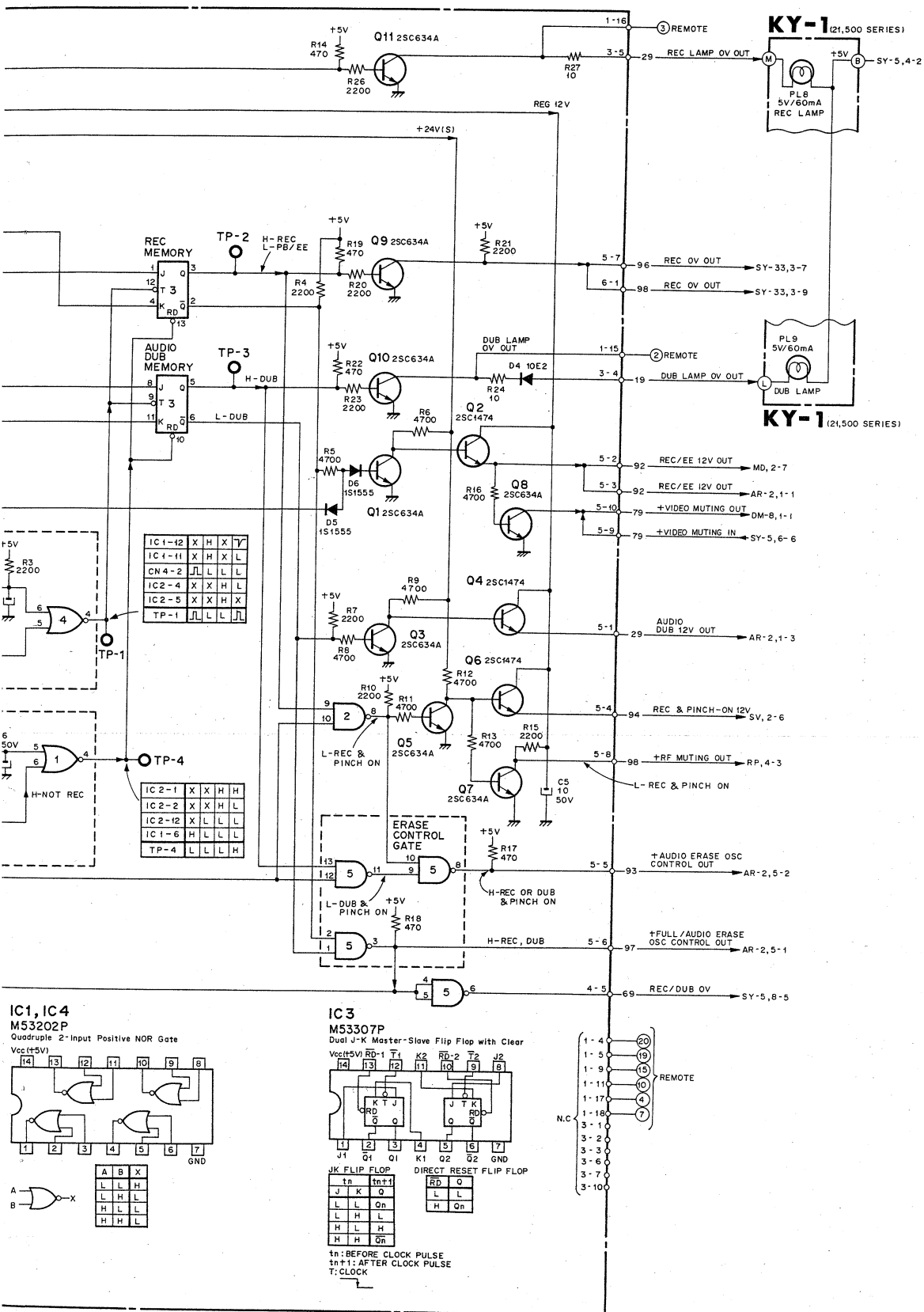
SY-35 (REC/PB SYSTEM CONTROL)

SY-3

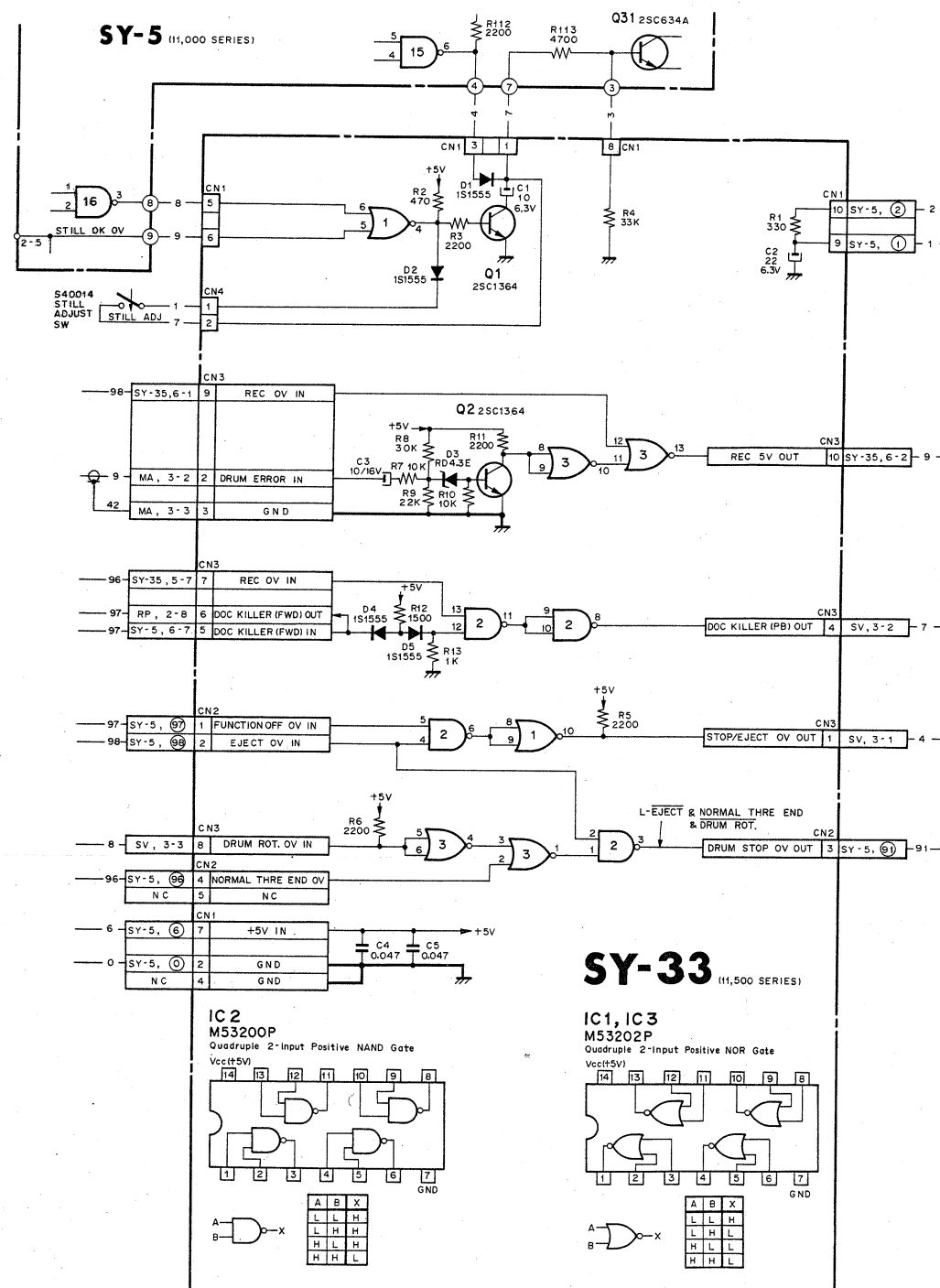


EO INPUT IGNAL	SYSTEM SELECT SW	CN6-2
L/SECAM	NTSC	7Hz
L/SECAM	PAL/SECAM	H
NTSC	PAL/SECAM	4Hz
NTSC	NTSC	H

H: HIGH LEVEL



SY-33 (SYSTEM CONTROL)

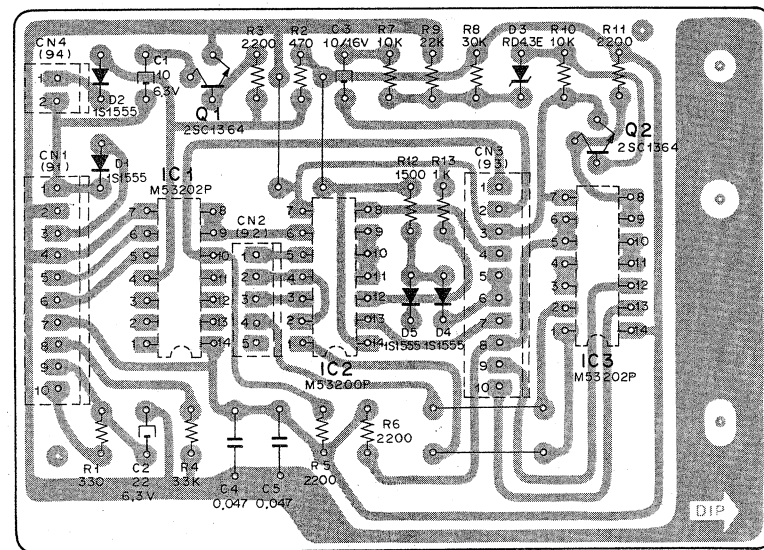


SY-35 (REC/PB SYSTEM CONTROL)
JN-1 (REMOTE CONNECTOR JUNCTION BOARD)

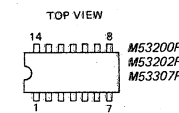
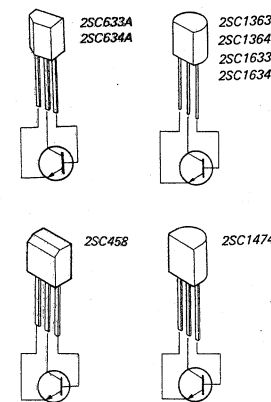
TOP VIEW
 14 8
 M53200P
 M53202P
 1 7

2SC403C
 2.5mm

2SC1363
2SC1364
2SC1633
2SC1634
 2.5mm



SY-33-SOLDERING SIDE-(11,500 SERIES)



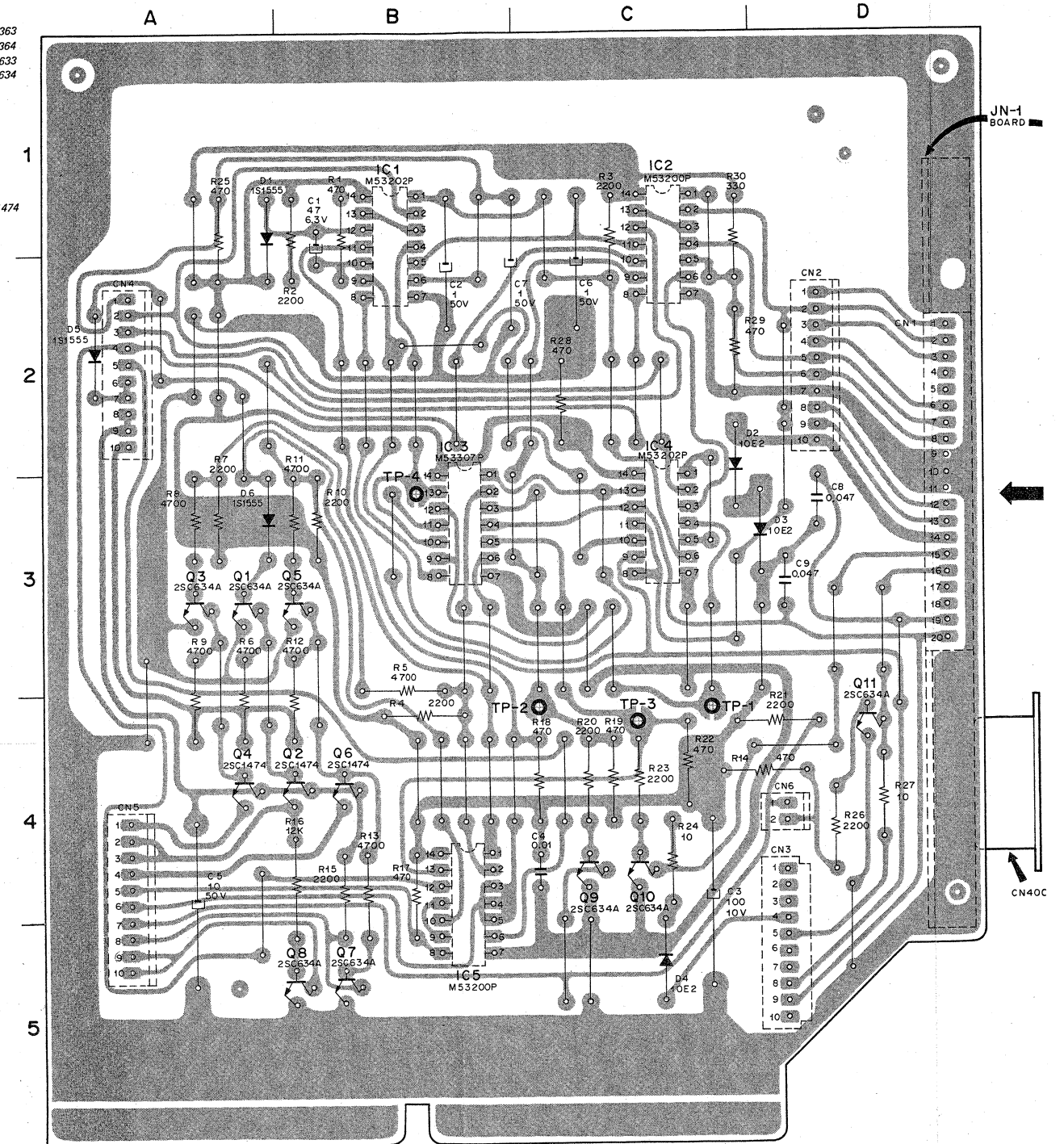
CN1	D - 2
CN2	D - 2
CN3	D - 4
CN4	A - 2
CN5	A - 4
CN6	D - 4

D1	A - 1
D2	C - 2
D3	D - 3
D4	C - 5
D5	A - 2
D6	A - 3

IC1	B - 1
IC2	C - 1
IC3	B - 3
IC4	C - 3
IC5	B - 4

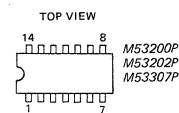
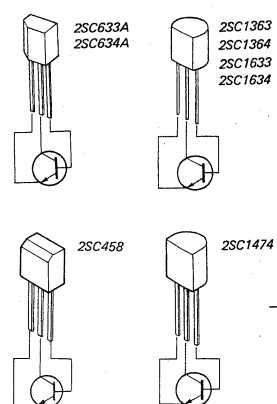
Q1	A - 3
Q2	B - 4
Q3	A - 3
Q4	A - 4
Q5	B - 3
Q6	B - 4
Q7	B - 5
Q8	B - 5
Q9	C - 4
Q10	C - 4
Q11	D - 4

TP-1 C - 4
TP-2 C - 4
TP-3 C - 4
TP-4 B - 3



SY-35 (REC/PB SYSTEM CONTROL)
JN-1 (REMOTE CONNECTOR JUNCTION BOARD)

SY-35 BOARD - SOLDERING SIDE -



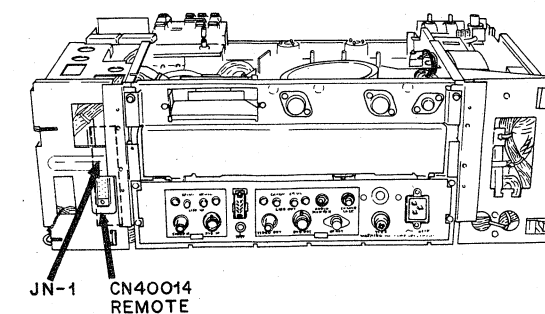
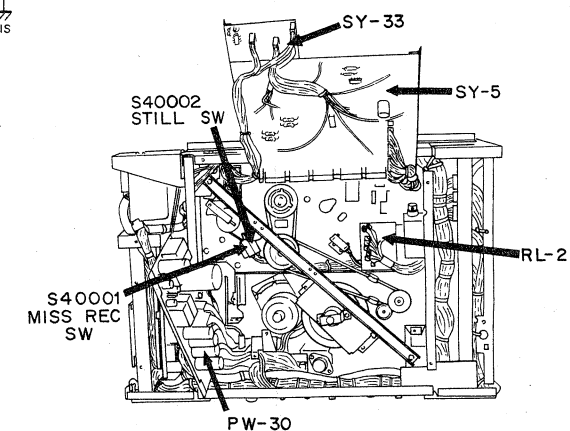
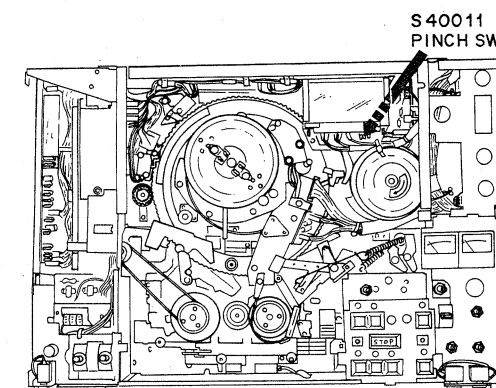
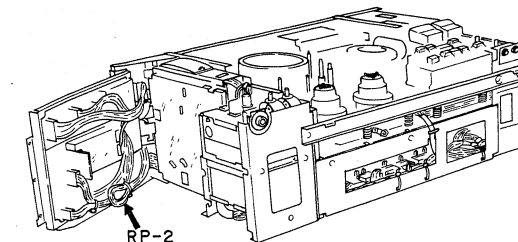
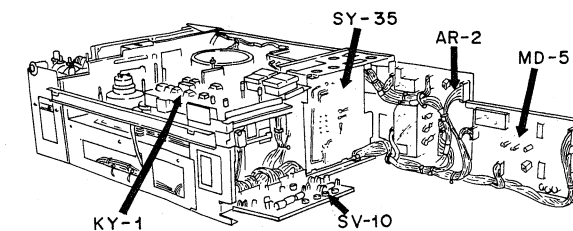
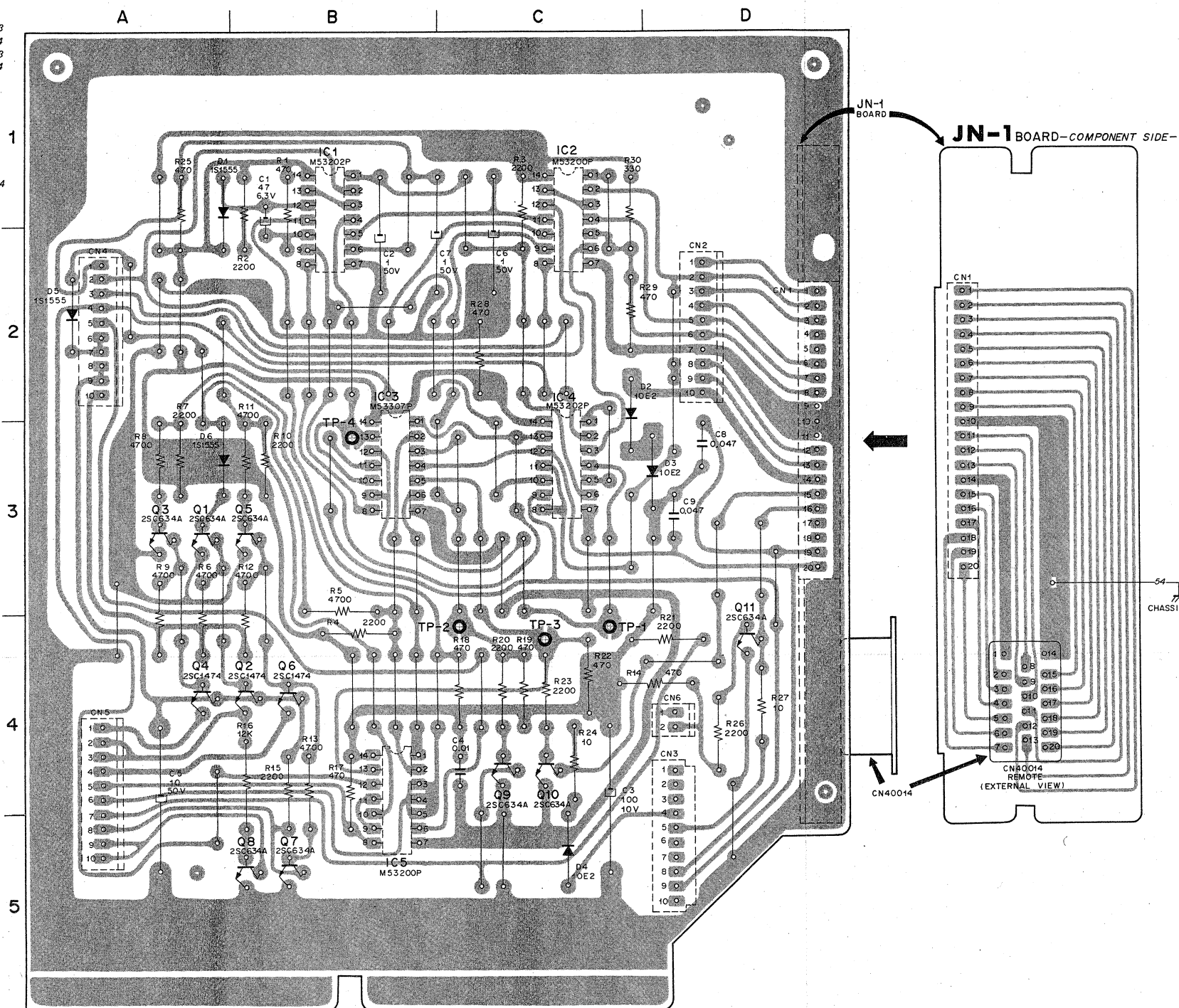
CN1 D - 2
CN2 D - 2
CN3 D - 4
CN4 A - 2
CN5 A - 4
CN6 D - 4

D1 A - 1
D2 C - 2
D3 D - 3
D4 C - 5
D5 A - 2
D6 A - 3

IC1 B - 1
IC2 C - 1
IC3 B - 3
IC4 C - 3
IC5 B - 4

Q1 A - 3
Q2 B - 4
Q3 A - 3
Q4 A - 4
Q5 B - 3
Q6 B - 4
Q7 B - 5
Q8 B - 5
Q9 C - 4
Q10 C - 4
Q11 D - 4

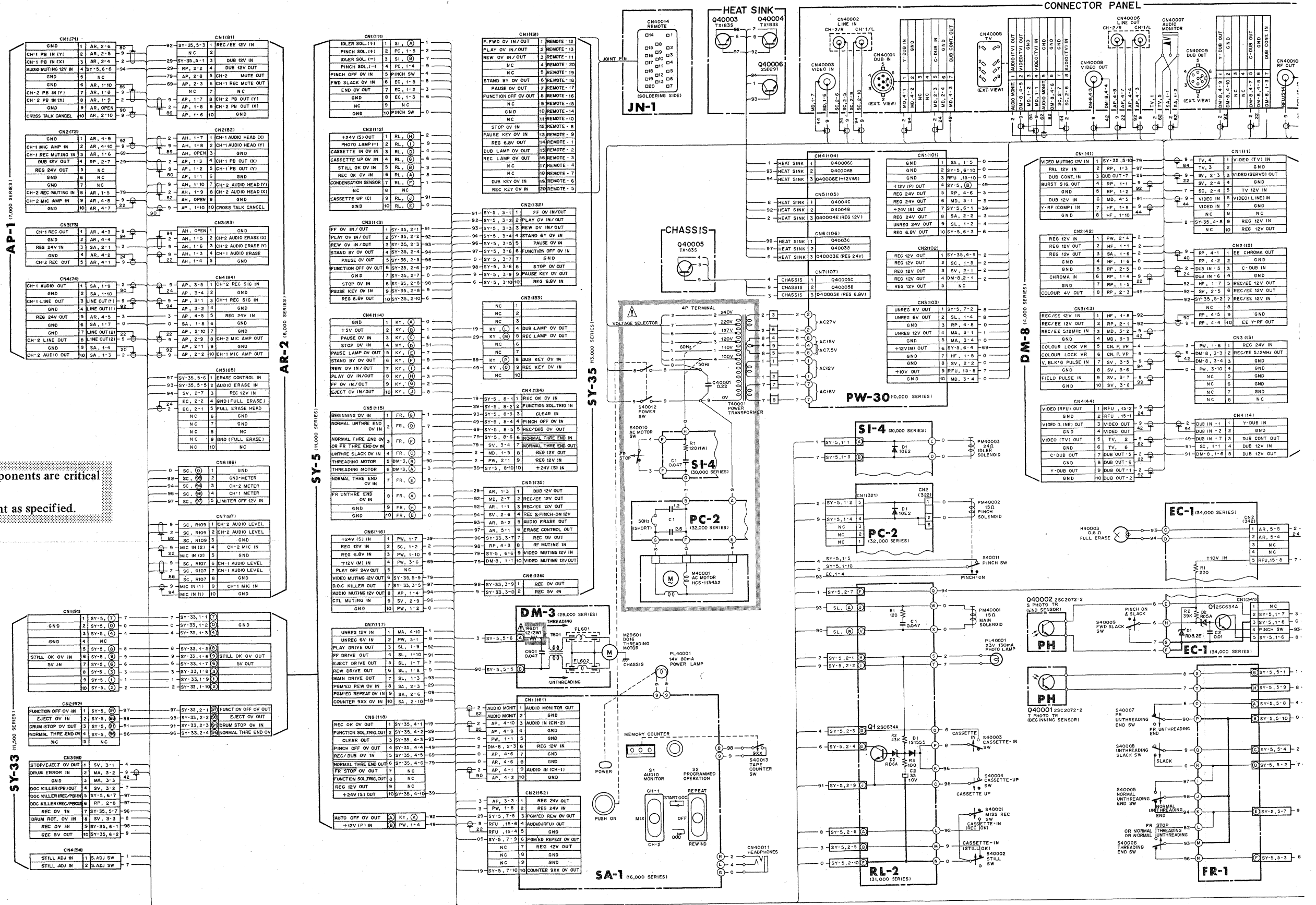
TP-1 C - 4
TP-2 C - 4
TP-3 C - 4
TP-4 B - 3

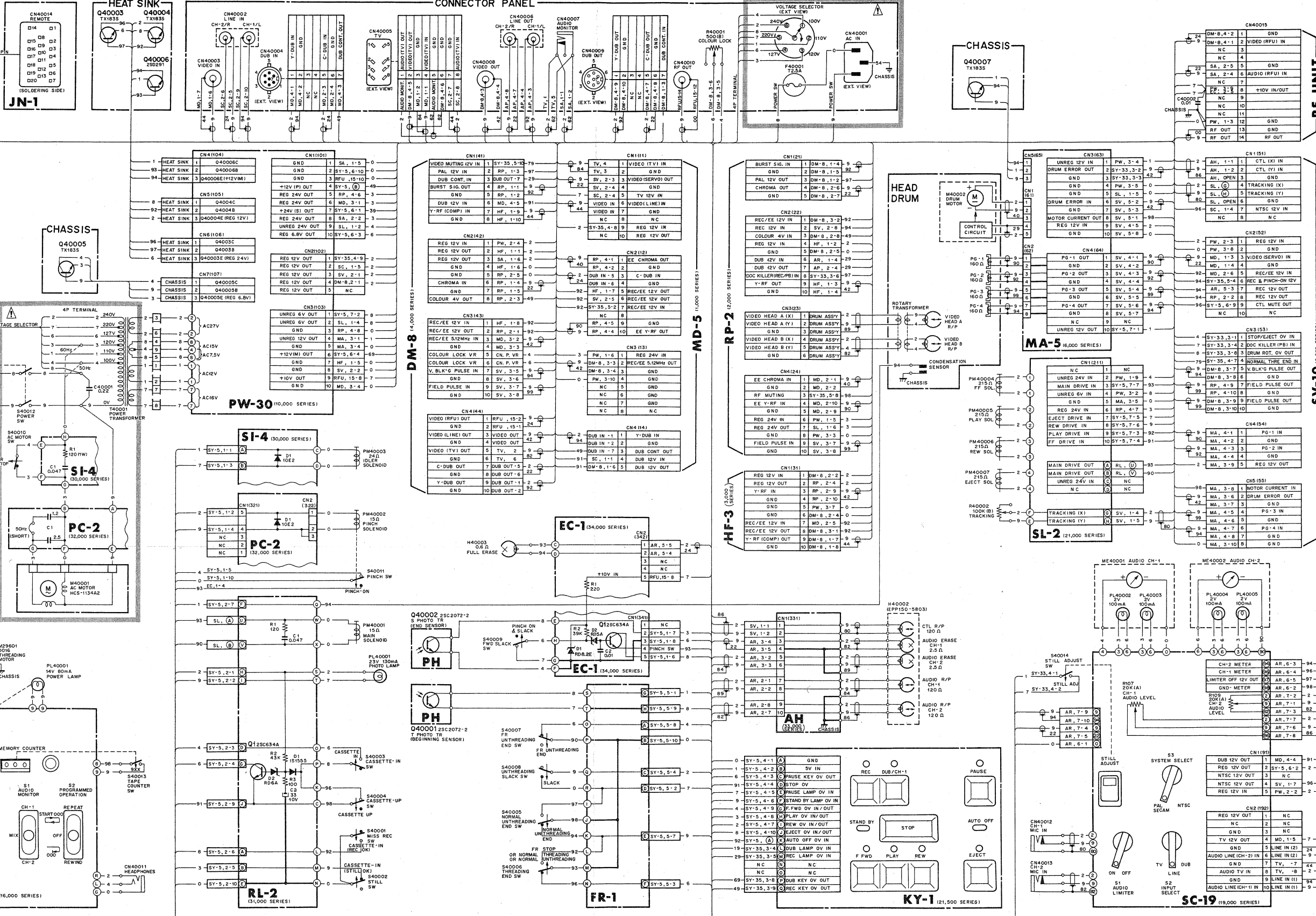


FRAME WIRING

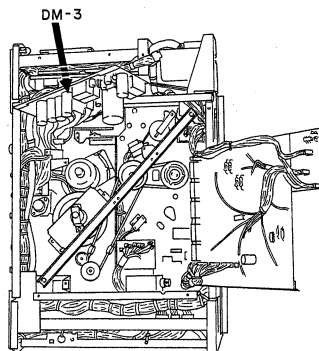
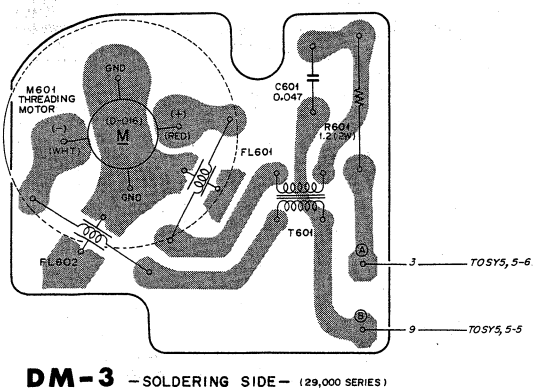
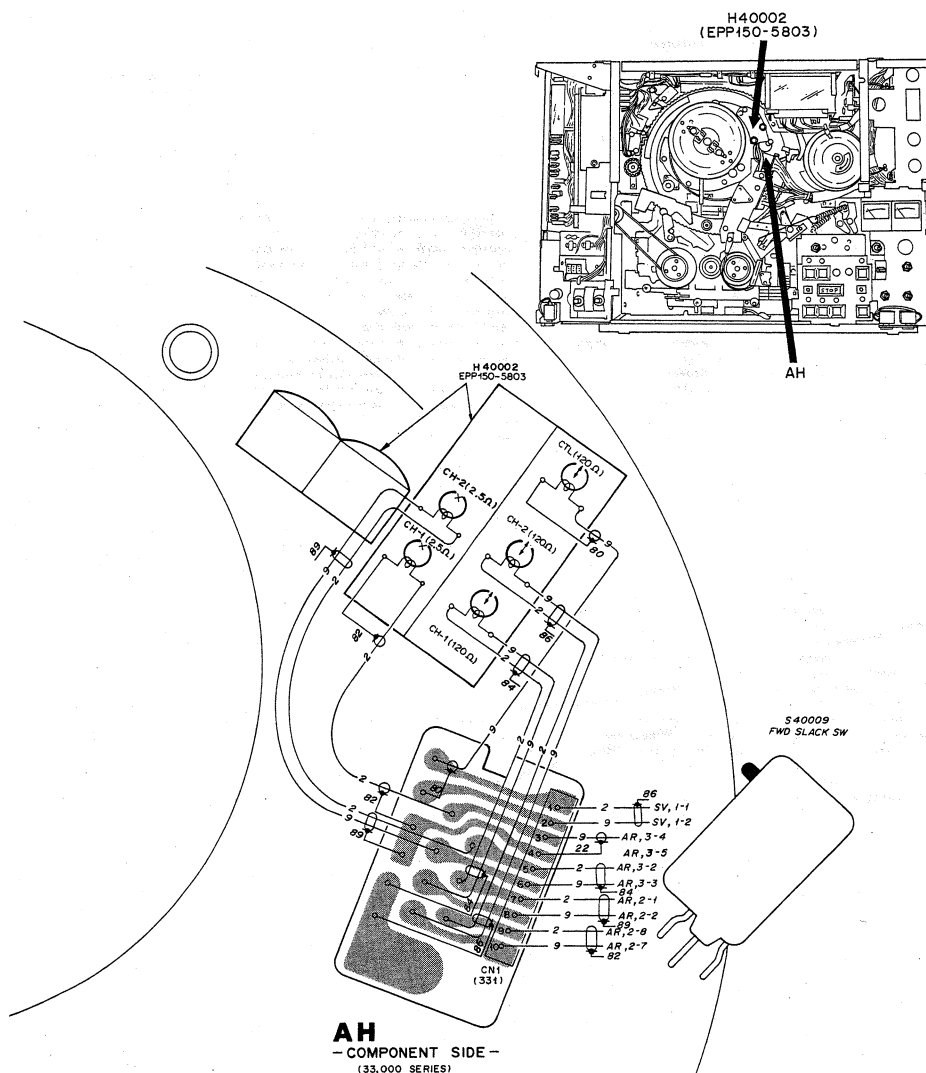
NOTE:

- The shaded and -marked components are critical to safety. Replace only with same component as specified.



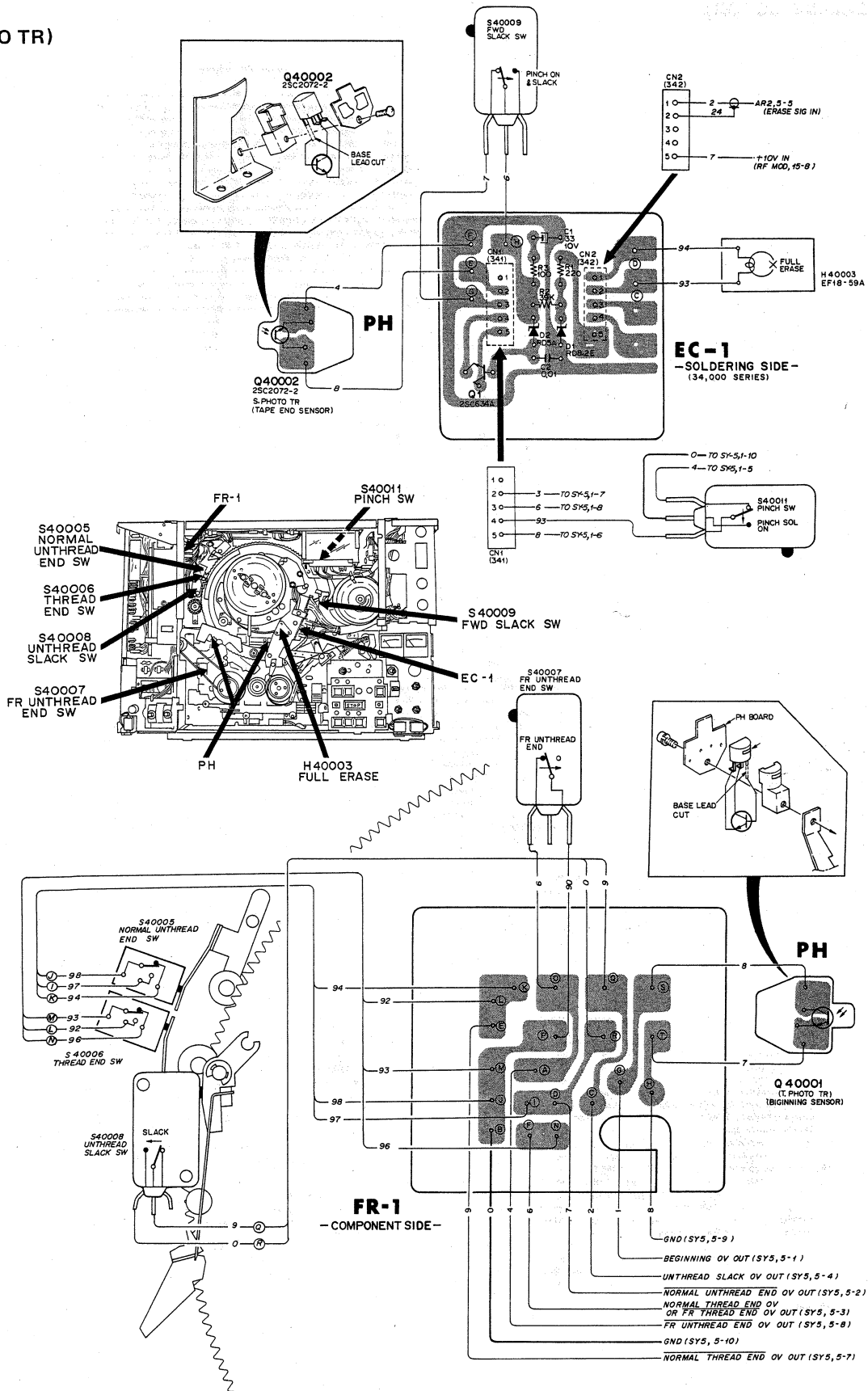


AH (AUDIO/CTL HEAD) DM-3 (THREADING MOTOR)



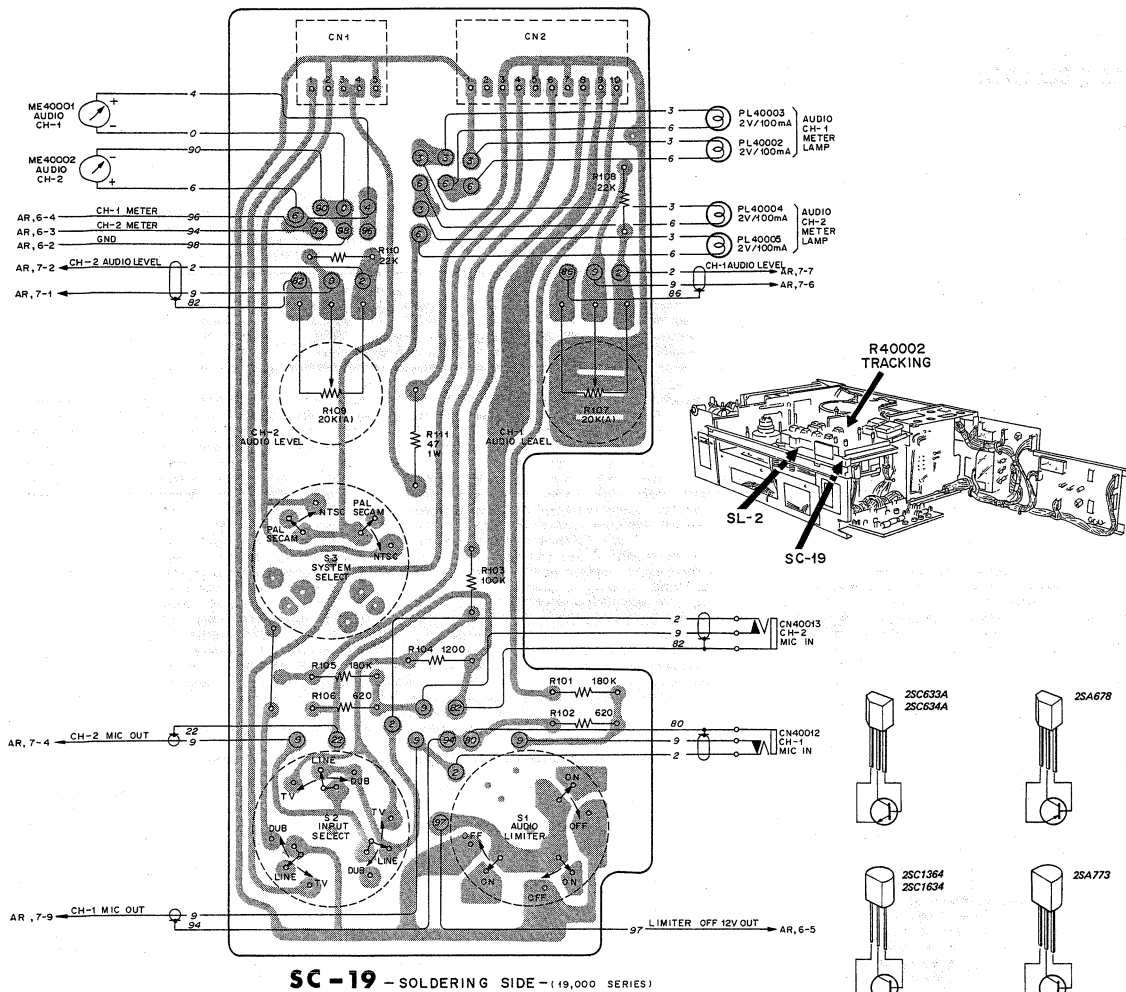
EC-1/FR-1/ PH

EC-1
FR-1
PH (PHOTO TR)

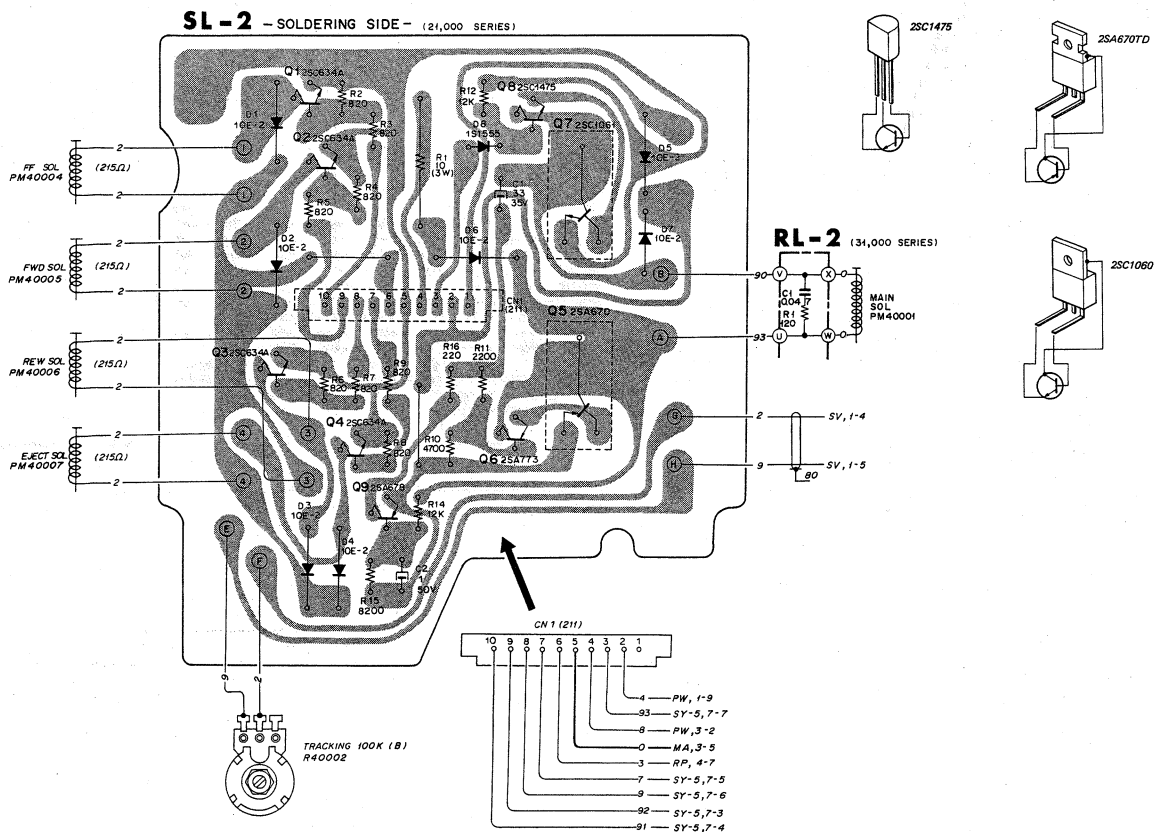


SC-19/SL-2

SC-19
SL-2



SC-19 - SOLDERING SIDE - (19,000 SERIES)



SECTION 13

SPARE PARTS AND JIG

13-1. PARTS INFORMATION

1. Safety Related Component Warning

Components identified by shading on the schematic diagrams, exploded views and electrical spare parts list are critical to safe operation. Replace these components with Sony parts whose part numbers appear as shown in this manual or in service bulletins and service manual supplements published by Sony.

2. Replace Parts that are supplied from Sony Parts Center can sometimes have different shape and external appearance than what are actually used in equipment. This is due to "accomodating the improved parts and/or engineering changes" or "standardization of genuine parts".

- This manual's exploded views and electrical spare parts lists are indicating the parts numbers of "the standardized genuine parts at present".
- Regarding engineering parts changes in our engineering department, refer Sony service bulletins and service manual supplements.

3. **Printed Components in Bold-Face type** on the exploded views and electrical spare parts list are normally stocked for replacement purposes. The remaining parts are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

4. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

5. (T) after a spring description is shown on the exploded views in order to indicate the number of a spring turn required for the use.

(Example) Spring, tension (24T); This spring must be cut at its 24th turn for actual use.

6. Screws

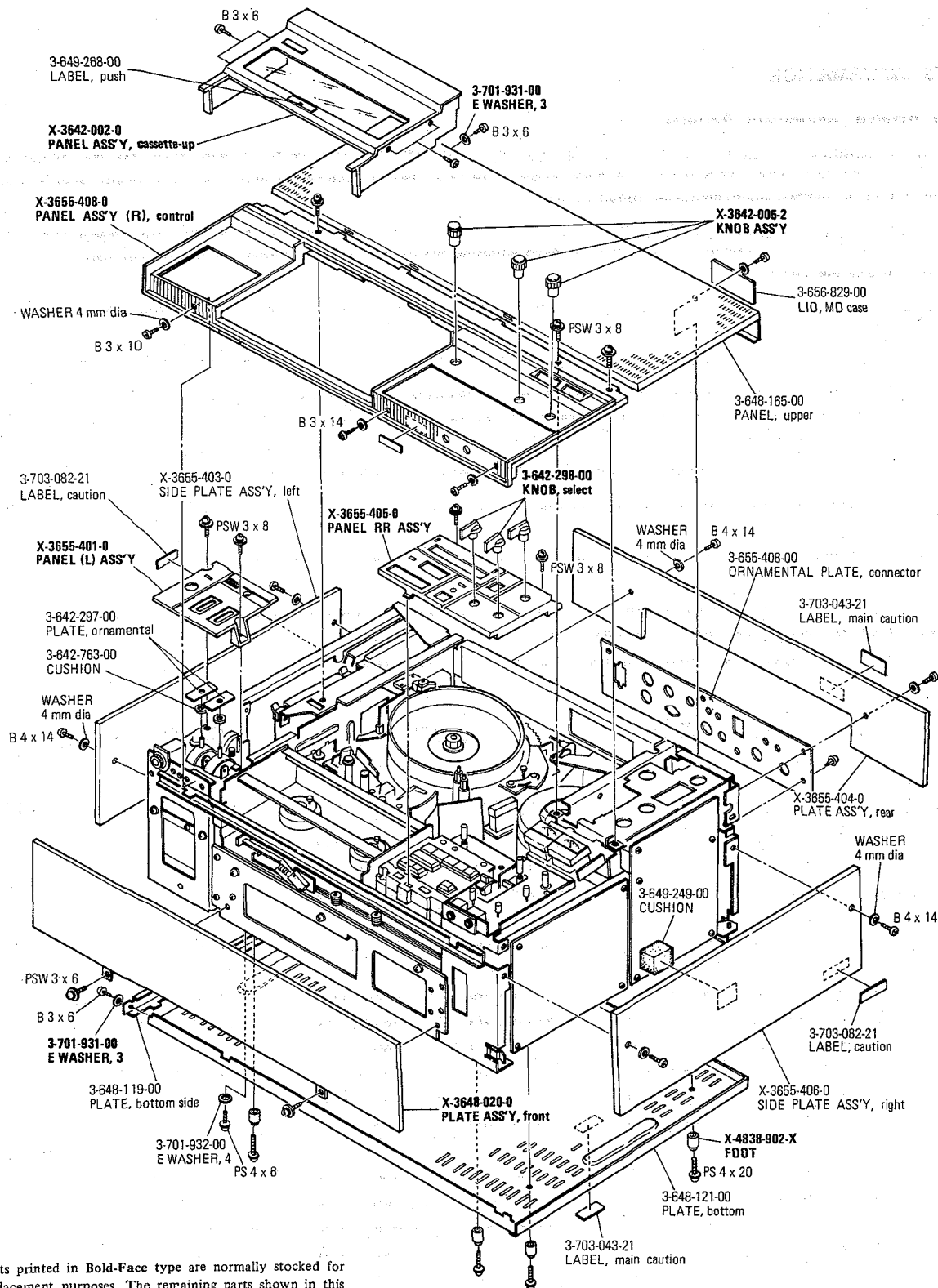
- All the screws used in this machine are the TOTSU type unless otherwise noted. The screws are interchangeable with the Phillips type (⊕) and slotted type (⊖) screws.
- Please order as the following part number when ordering the TOTSU type screws.



Size	PS	PSW	B (BZnN)	B (Cr-N)	PTT	PTTWH
2.6 x 4	7-621-972-05	_____	7-621-912-10	7-621-912-18	_____	_____
2.6 x 6	7-621-972-25	_____	7-621-912-30	7-621-912-38	_____	_____
2.6 x 8	7-621-972-35	_____	7-621-912-40	7-621-912-48	_____	_____
2.6 x 10	7-621-972-45	_____	7-621-912-50	7-621-912-58	_____	_____
2.6 x 12	7-621-972-55	_____	7-621-912-60	7-621-912-68	_____	_____
3 x 6	7-686-447-01	7-686-527-01	7-686-624-09	7-686-624-04	7-687-411-31	7-687-510-31
3 x 8	7-686-448-01	7-686-528-01	7-686-625-09	7-686-625-04	7-687-412-31	7-687-511-31
3 x 10	7-686-449-01	7-686-529-01	7-686-626-09	7-686-626-04	7-687-413-31	7-687-512-31
3 x 12	7-686-450-01	7-686-530-01	7-686-627-09	7-686-627-04	_____	_____
3 x 16	7-686-452-01	7-686-532-01	7-686-629-09	7-686-629-04	_____	_____
3 x 25	7-686-454-01	7-686-534-01	7-686-631-09	7-686-631-04	_____	_____
4 x 8	7-686-468-01	_____	_____	7-686-635-04	_____	_____
4 x 12	7-686-470-01	_____	_____	7-686-637-04	_____	_____
4 x 14	7-686-471-01	_____	_____	7-686-638-04	_____	_____
4 x 16	7-686-472-01	_____	_____	7-686-639-04	_____	_____
4 x 20	7-686-473-01	_____	_____	7-686-640-04	_____	_____

13-2. EXPLODED VIEW

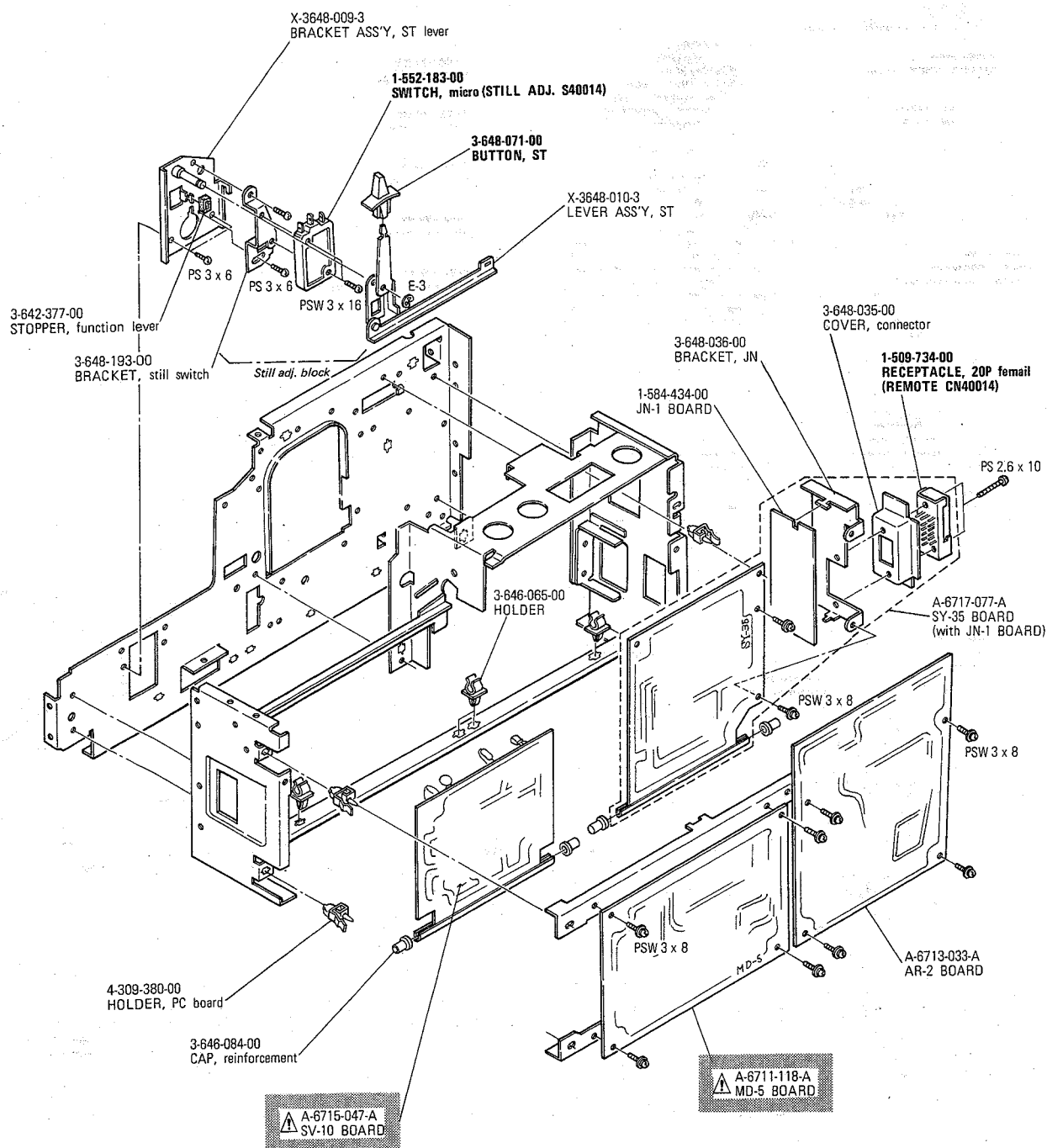
Cabinet Block



NOTE:

1. Parts printed in **Bold-Face** type are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in **Bold-Face** type will be processed, but allow for additional delivery time.
2. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

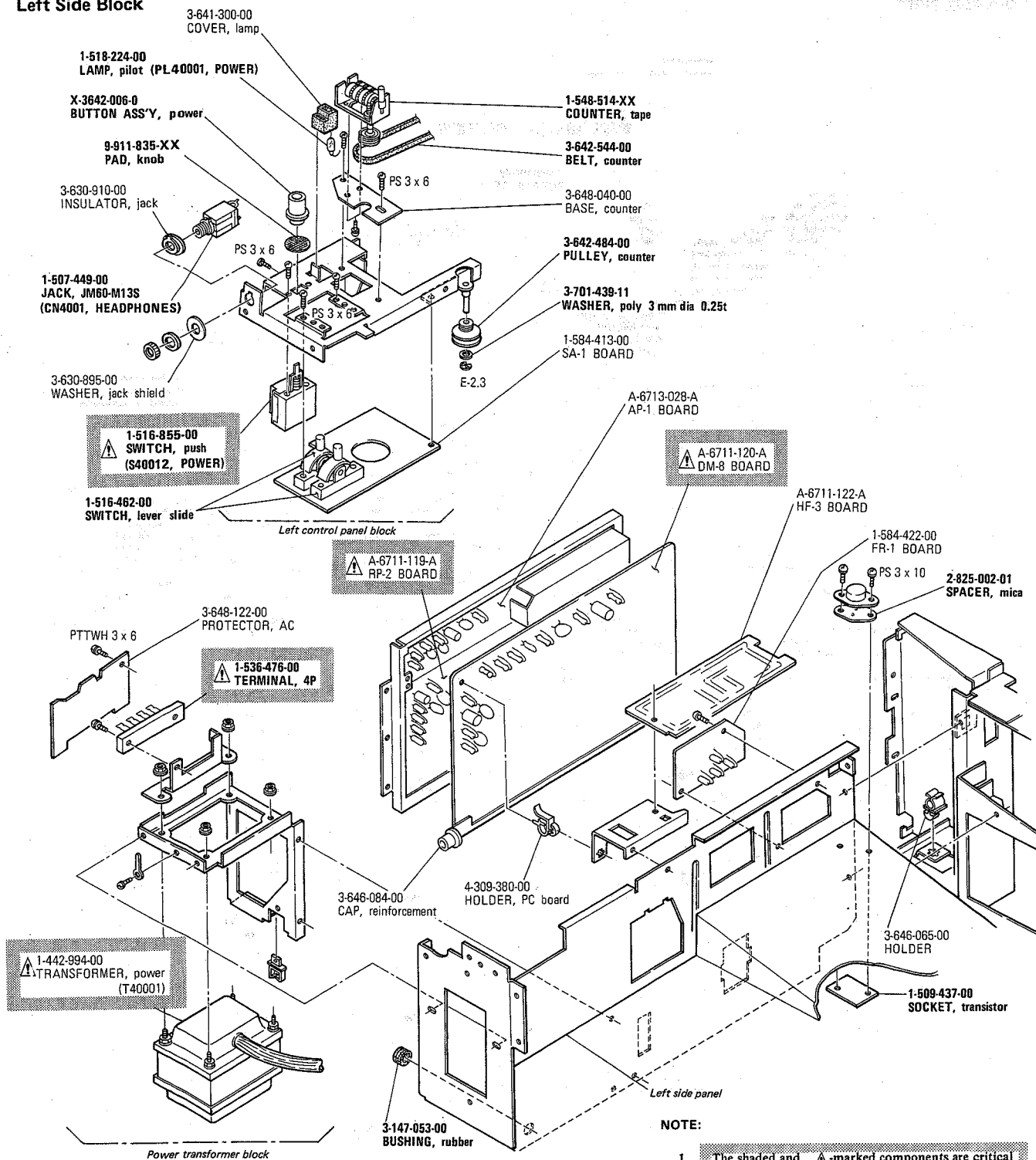
Right Side Block



NOTE:

1. The shaded and -marked components are critical to safety. Replace only with same component as specified.
2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in **Bold-Face type** will be processed, but allow for additional delivery time.
3. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

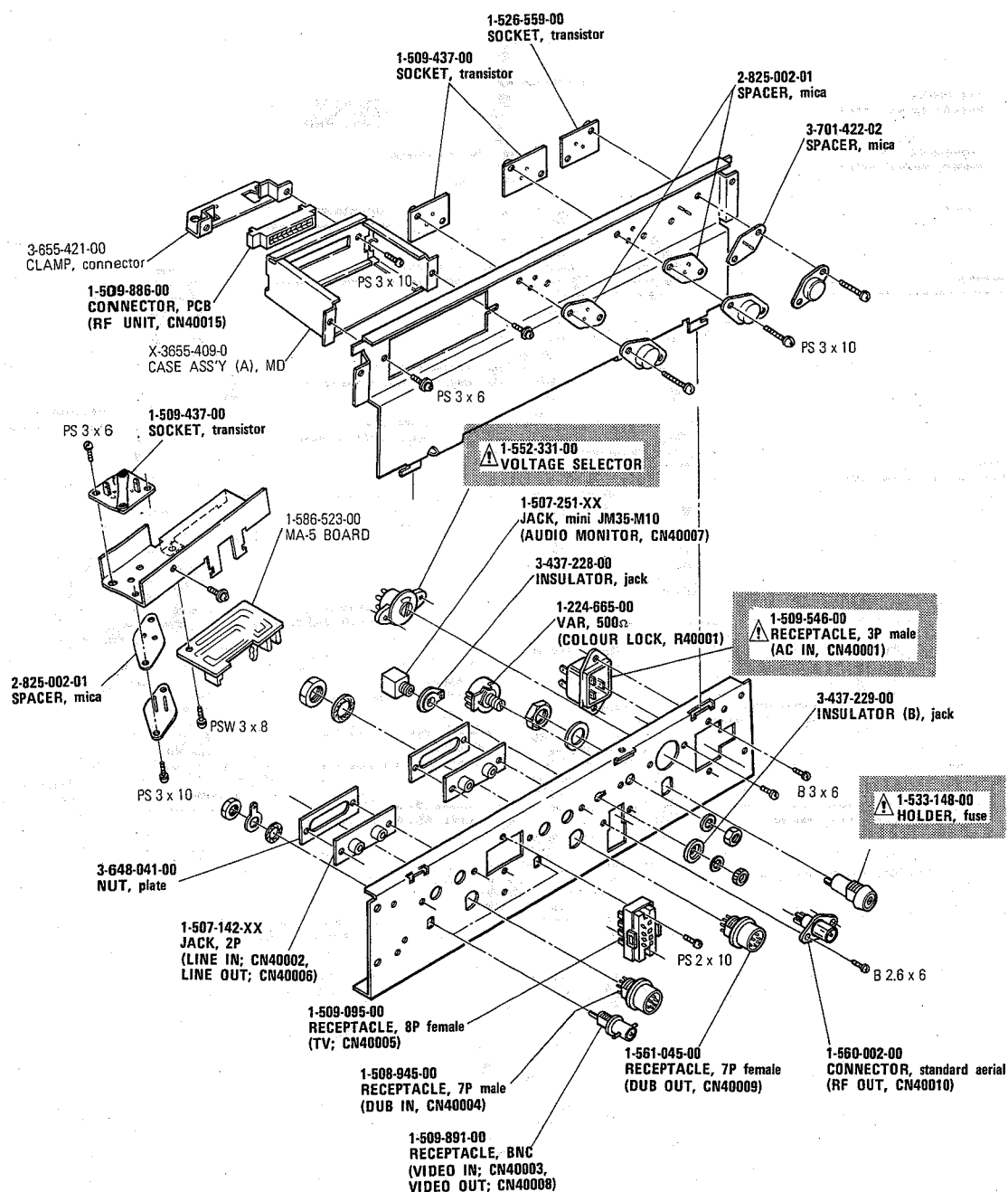
Left Side Block



NOTE:

1. The shaded and $\triangle$ -marked components are critical to safety. Replace only with same component as specified.
2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in **Bold-Face type** will be processed, but allow for additional delivery time.
3. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

Connector Panel Block



NOTE:

1. The shaded and Δ -marked components are critical to safety.
Replace only with same component as specified.
2. Parts printed in Bold-Face type are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.
3. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

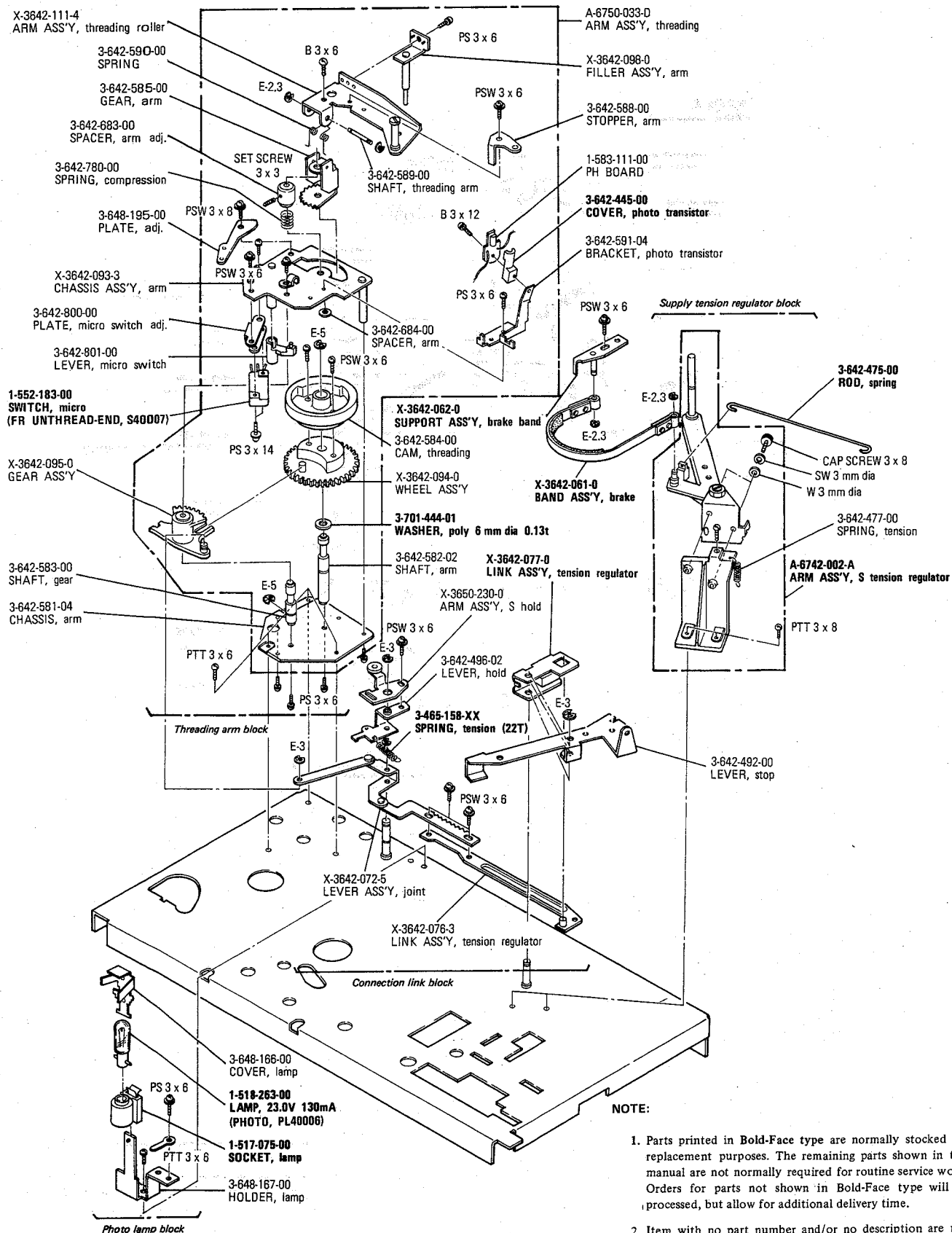
1. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in **Bold-Face type** will be processed, but allow for additional delivery time.
2. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

1980-1981 1982-1983 1984-1985 1986-1987 1988-1989 1989-1990

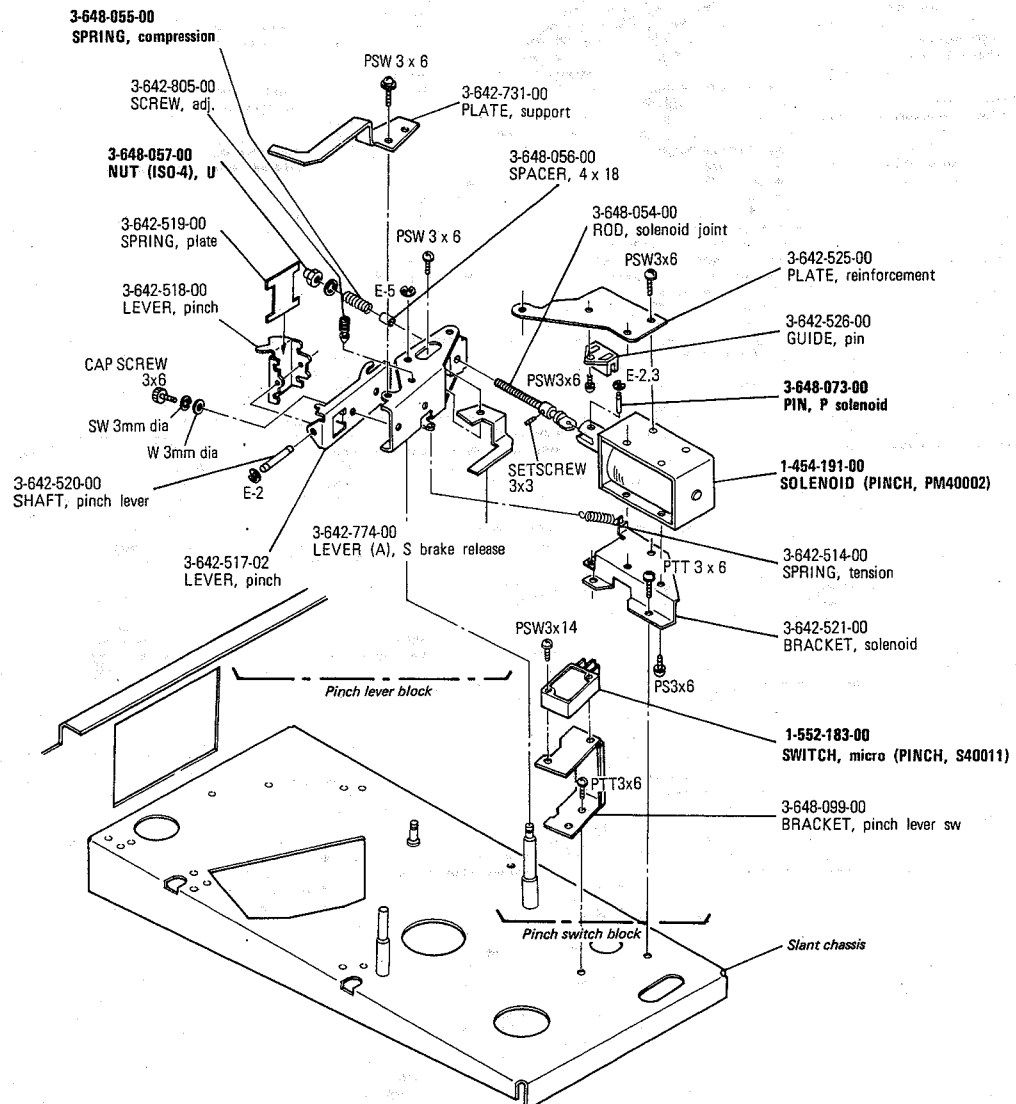


- 13-8

Tape Threading Block (2) threading arm



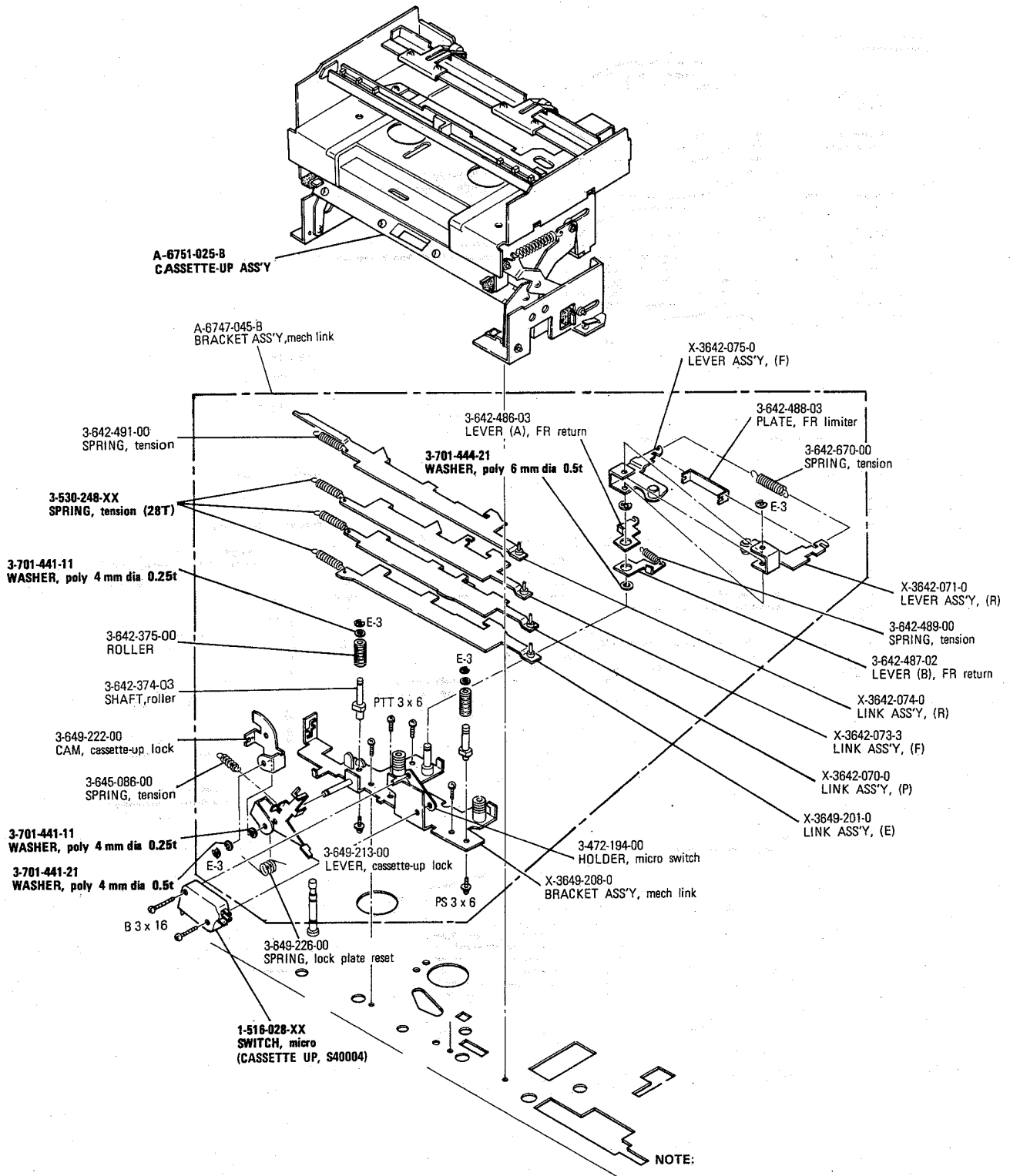
Pinch Lever Block



NOTE:

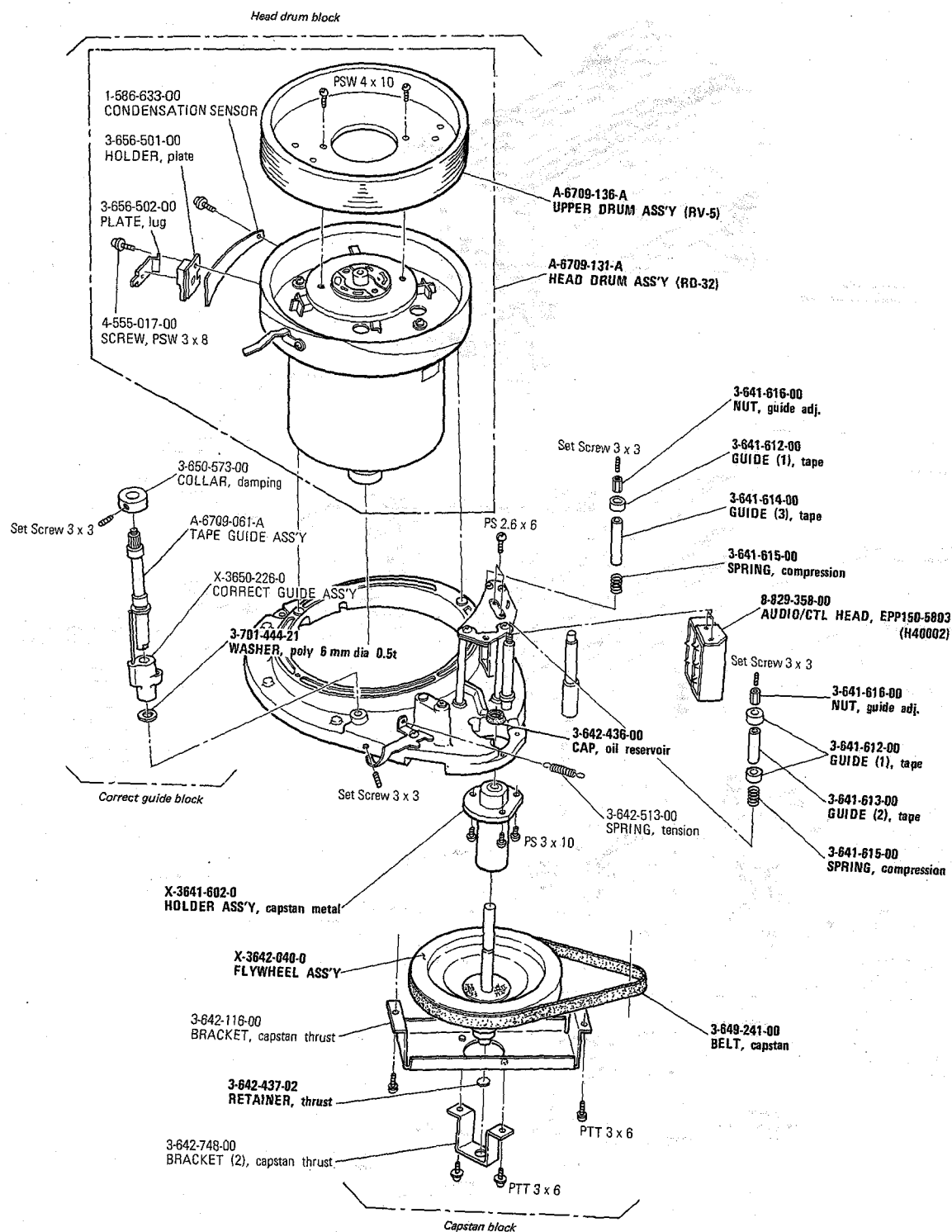
1. Parts printed in **Bold-Face** type are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in **Bold-Face** type will be processed, but allow for additional delivery time.
2. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

Mechanical Link and Cassette-up Block



1. Parts printed in **Bold-Face** type are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in **Bold-Face** type will be processed, but allow for additional delivery time.
2. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

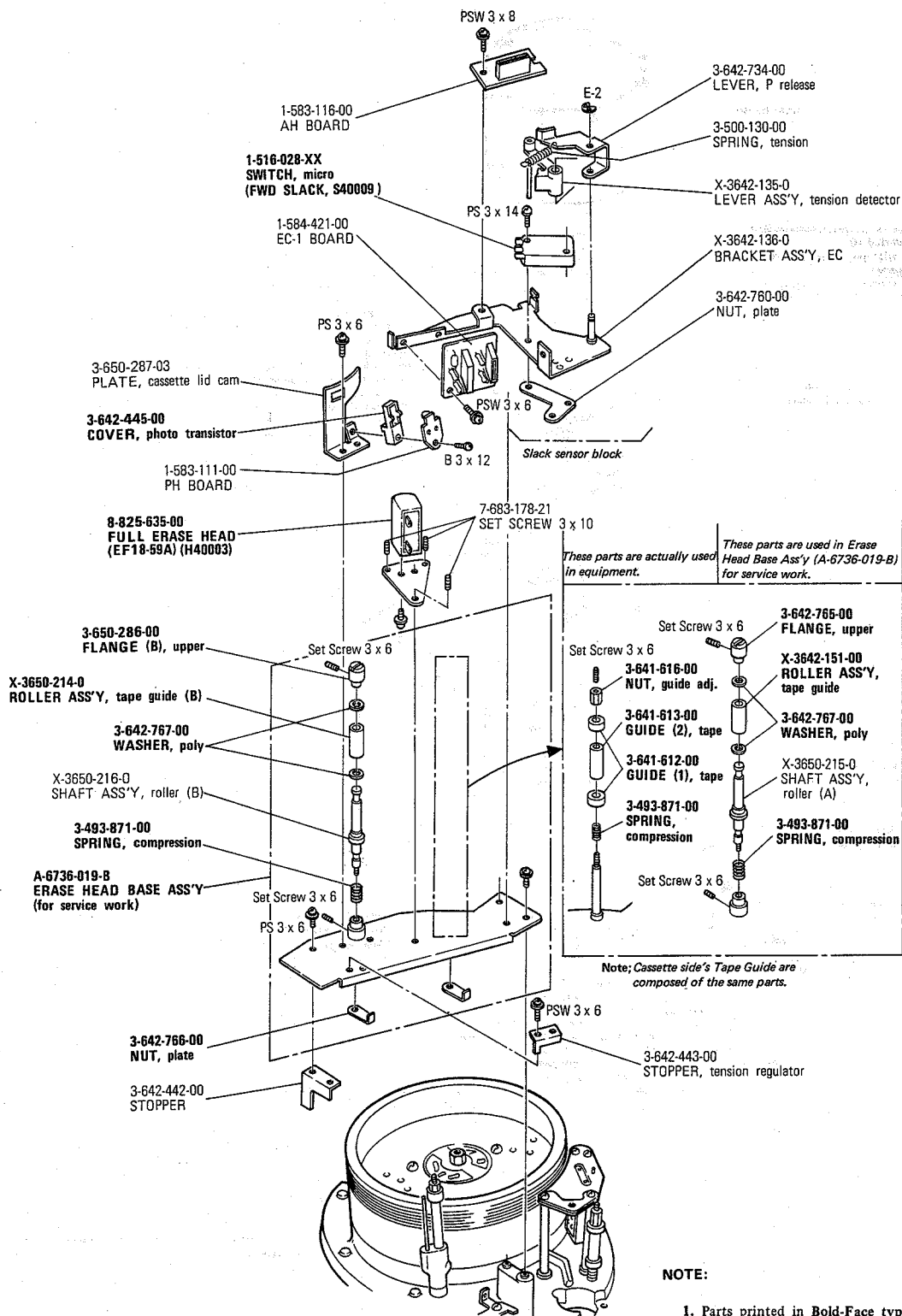
Head Drum and Slant Base Block



NOTE:

1. Parts printed in **Bold-Face** type are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in **Bold-Face** type will be processed, but allow for additional delivery time.
2. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

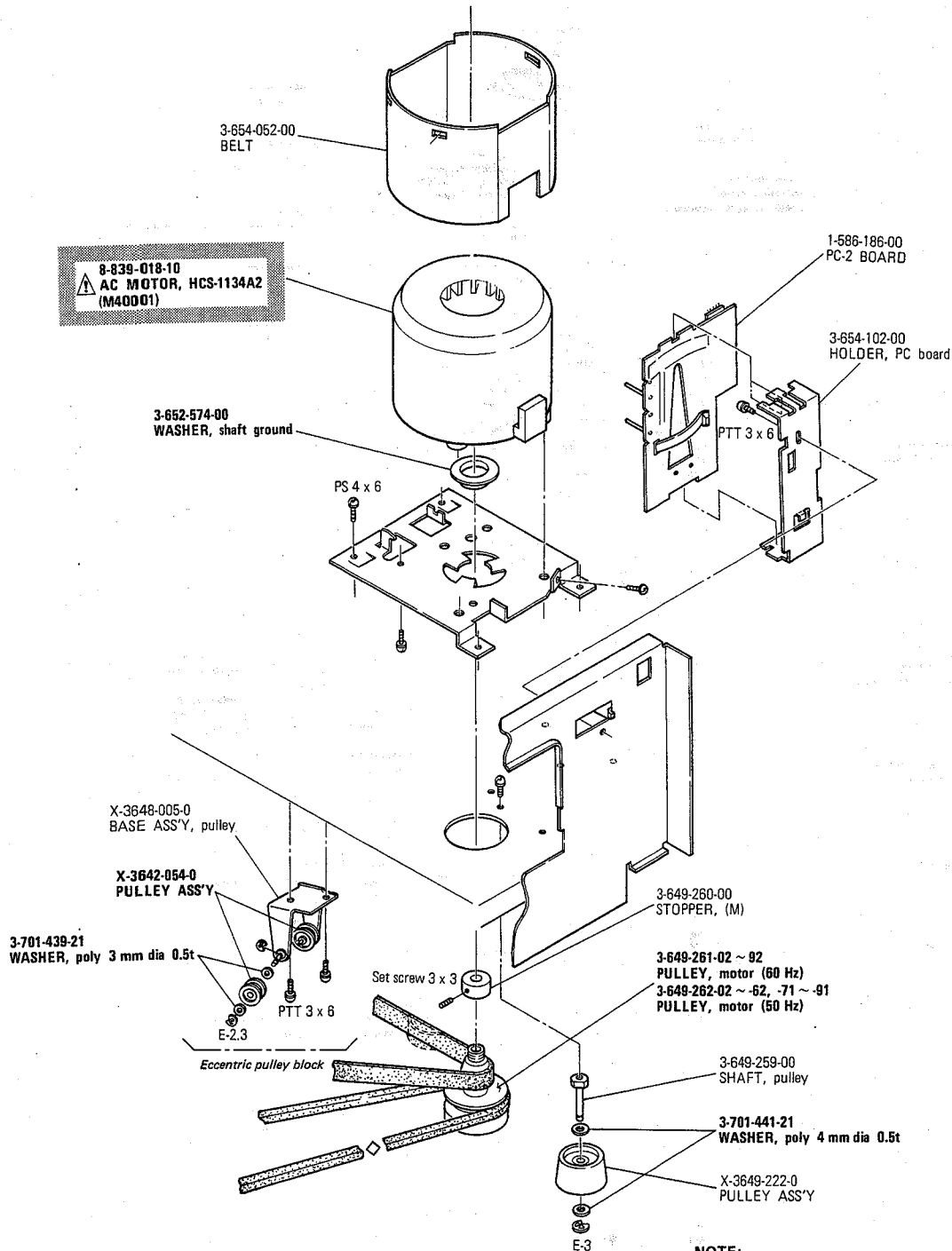
Erase Head Block



NOTE:

1. Parts printed in **Bold-Face** type are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in **Bold-Face** type will be processed, but allow for additional delivery time.
2. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

Motor Block



NOTE:

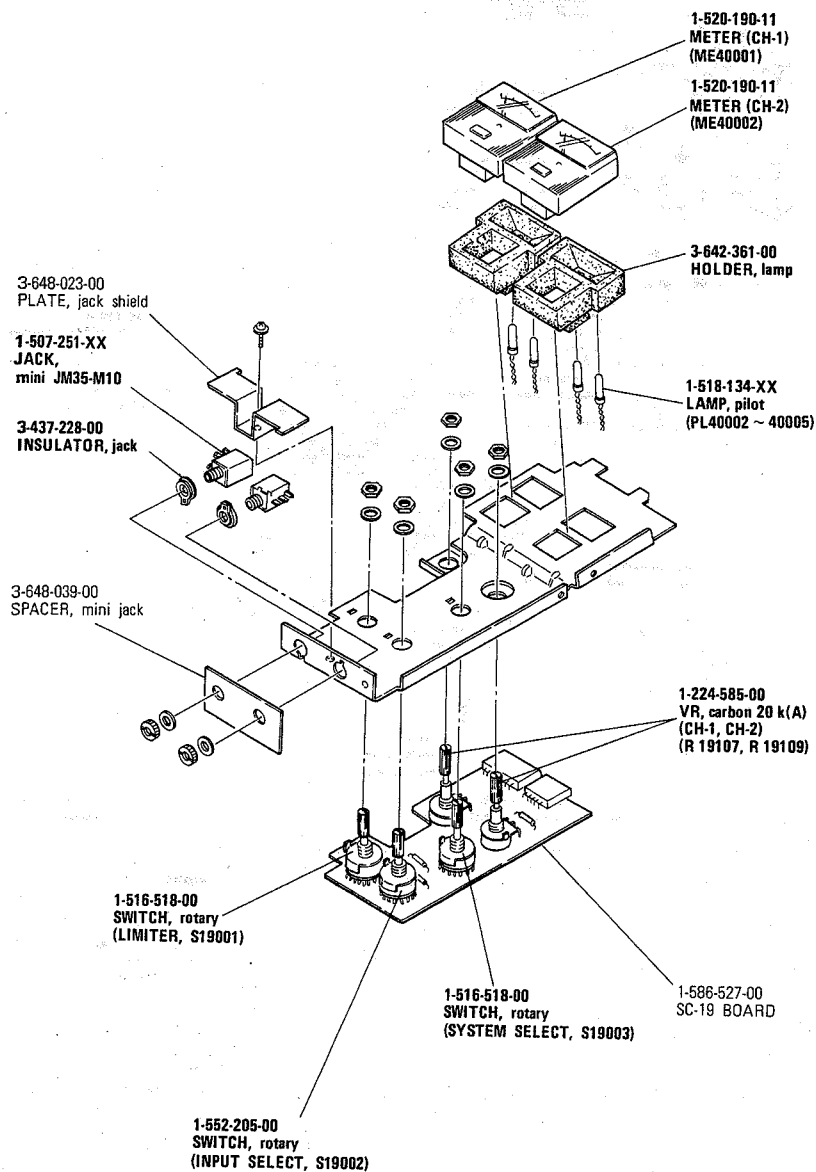
1. The shaded and -marked components are critical to safety. Replace only with same component as specified.
2. Parts printed in **Bold-Face** type are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in **Bold-Face** type will be processed, but allow for additional delivery time.
3. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

[illegible]

- 13-15**

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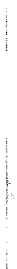
Right Control Panel Block.



NOTE:

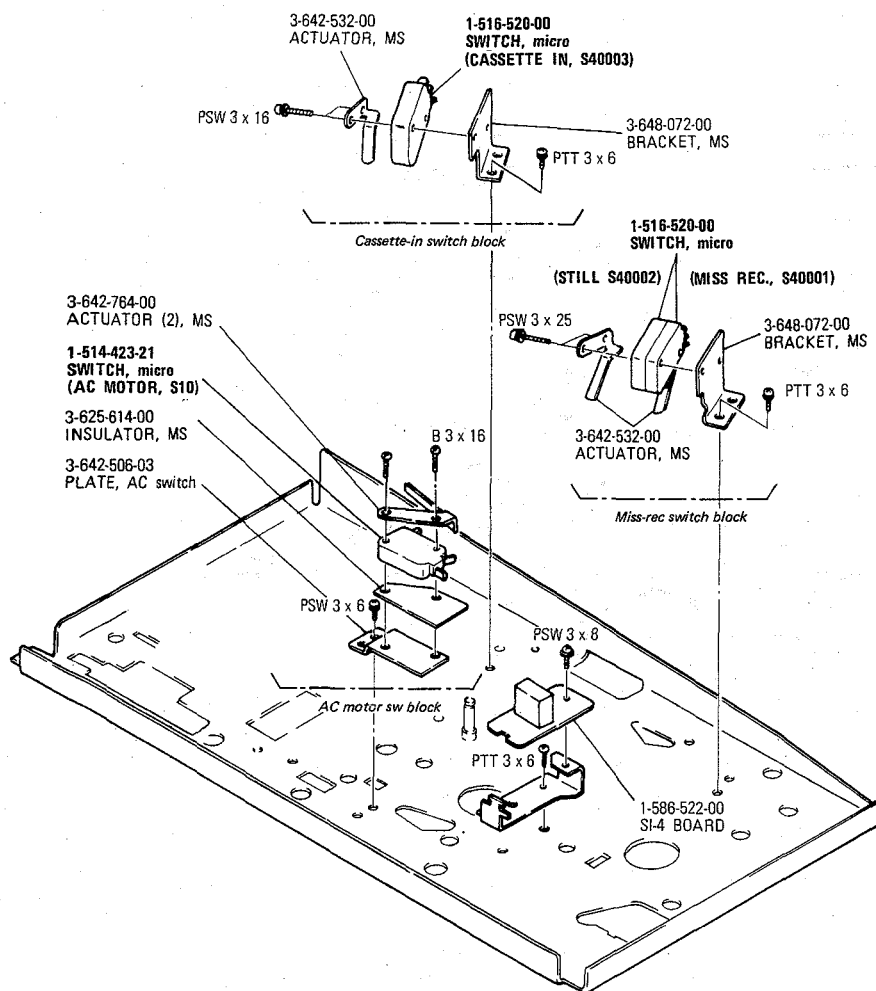
1. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in **Bold-Face type** will be processed, but allow for additional delivery time.
2. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

1. $\mathcal{L}_1(\mathcal{L}_2(\mathcal{L}_3))$ is a $\mathcal{L}_1$ -category.



1. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in **Bold-Face type** will be processed, but allow for additional delivery time.
2. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

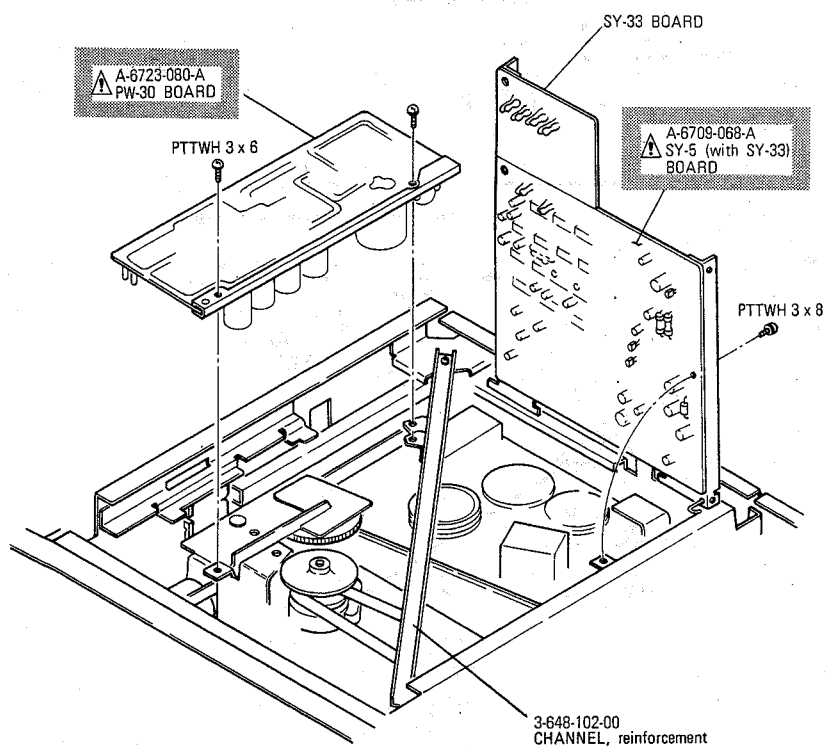
Chassis Block, bottom view (2) micro switch block



NOTE:

1. Parts printed in **Bold-Face** type are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in **Bold-Face** type will be processed, but allow for additional delivery time.
2. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

Chassis Block bottom view (3) printed circuit board



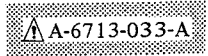
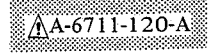
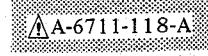
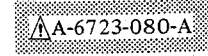
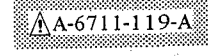
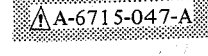
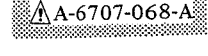
NOTE:

1. The shaded and -marked components are critical to safety.
Replace only with same component as specified.
2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in **Bold-Face type** will be processed, but allow for additional delivery time.
3. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

13-3. ELECTRICAL PARTS LIST

Ref. No. Part No. Description

MOUNTED BOARD

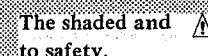
	A-6713-028-A	AP-1 board
	 A-6713-033-A	AR-2 board
	 A-6711-120-A	DM-8 board
	A-6711-122-A	HF-3 board
	 A-6711-118-A	MD-5 board
	 A-6723-080-A	PW-30 board
	 A-6711-119-A	RP-2 board
	 A-6715-047-A	SV-10 board
	 A-6707-068-A	SY-5 (with SY-33) board
	A-6716-077-A	SY-35 (with JN-1) board

Ref. No. Part No. Description

PRINTED WIRING BOARD

	1-583-116-00	AH board
	1-584-424-00	DM-3 board
	1-584-421-00	EC-1 board
	1-584-422-00	FR-1 board
	1-584-434-00	JN-1 board
	1-584-417-00	KY-1 board
	1-586-523-00	MA-5 board
	1-586-186-00	PC-2 board
	1-583-111-00	PH board
	1-584-603-00	RL-2 board
	1-584-413-00	SA-1 board
	1-586-527-00	SC-19 board
	1-586-522-00	SI-4 board
	1-584-418-00	SL-2 board

NOTE:

1. The shaded and  -marked components are critical to safety.
Replace only with same component as specified.

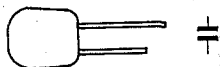
2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in **Bold-Face type** will be processed, but allow for additional delivery time.

CAPACITOR

Parts that are **not** listed in the "reference numbers order list" are shown in following table.
Reference numbers are omitted.

SILVERED MICA CAPACITOR

1 pF through 620 pF
± 5%, 50WV

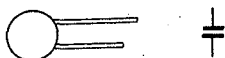


Parts No. 1-107-□□□-00

Value	Parts No. -□□□-	Value	Parts No. -□□□-	Value	Parts No. -□□□-	Value	Parts No. -□□□-
1 pF	098	15 pF	065	51 pF	078	180 pF	091
2	099	16	066	56	079	200	092
3	100	18	067	62	080	220	093
4	101	20	068	68	081	240	094
5	102	22	069	75	082	270	095
6	103	24	070	82	083	300	096
7	104	27	071	91	084	330	097
8	105	30	072	100	085	360	231
9	106	33	073	110	086	390	232
10	061	36	074	120	087	430	233
11	062	39	075	130	088	470	234
12	063	43	076	150	089	510	235
13	064	47	077	160	090	560	236
						620	237

CERAMIC CAPACITOR

0.001 μF through 0.1 μF
50WV



Parts No. 1-161-□□□-00

Value	Parts No. -□□□-	Substitute	Value	Parts No. -□□□-	Substitute
0.001 μF	039	(1-102-074-00)	0.01 μF	051	(1-101-118-00)
0.0012	040		0.012	052	
0.0015	041		0.015	053	
0.0018	042		0.018	054	
0.0022	043	(1-102-100-00)	0.022	055	(1-101-005-00)
0.0027	044		0.027	056	
0.0033	045		0.033	057	
0.0039	046	(1-102-124-00)	0.039	058	
0.0047	047		0.047	059	(1-101-006-00)
0.0056	048		0.056	060	
0.0068	049		0.068	061	
0.0082	050		0.082	062	
			0.1	063	

NOTE:

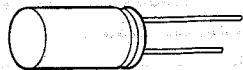
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ELECTROLYTIC CAPACITOR

0.47 μ F through 470 μ F

6.3VV through 50 (63, 100)V



Parts No. 1-123-□□□-00

Value	Parts No. -□□□-	Value	Parts No. -□□□-	Value	Parts No. -□□□-
0.47 μ F 50V		22 μ F 35V	342	100 μ F 50V	360
100	379	50		220 6.3	
1 50		63	371	10	308
100	380	33 6.3		16	321
2.2 50		10		25	334
100	381	16	318	35	346
3.3 25		25		50	361
35		35	343	330 6.3	
50		50		10	309
100	382	63	372	16	322
4.7 25		47 6.3		25	335
35		10	306	35	347
50		16		50	362
63	369	25	332	470 6.3	298
10 10		35		10	310
16		50	359	16	323
25		100 6.3		25	336
35		10	307	35	348
50	356	16		50	
22 16		25	333	63	377
25	330	35	345		

Ref. No.	Part No.	Description
MD-5 board		
C1009	1-123-299-00	elect 1000 μ F 6.3V
C1021	1-108-246-12	mylar 0.047 μ F 10% 50V
C1023	1-131-217-21	tantalum 2.2 μ F 10% 35V
C1032	1-108-227-12	mylar 0.001 μ F 10% 50V
C1033	1-131-211-21	tantalum 0.22 μ F 10% 35V
C1049	1-108-239-12	mylar 0.01 μ F 10% 50V
C1053	1-108-239-12	mylar 0.01 μ F 10% 50V
C1057	1-108-239-12	mylar 0.01 μ F 10% 50V

Ref. No.	Part No.	Description
C1059	1-108-239-12	mylar 0.01 μ F 10% 50V
C1072	1-108-239-12	mylar 0.01 μ F 10% 50V
C1075	1-108-239-12	mylar 0.01 μ F 10% 50V
C1076	1-108-239-12	mylar 0.01 μ F 10% 50V
C1083	1-141-167-11	trimmer 18pF
C1087	1-108-227-12	mylar 0.001 μ F 10% 50V
C1089	1-108-230-12	mylar 0.0022 μ F 10% 50V
C1090	1-108-239-12	mylar 0.01 μ F 10% 50V
C1091	1-108-239-12	mylar 0.01 μ F 10% 50V

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Ref. No.	Part No.	Description				Ref. No.	Part No.	Description			
RP-2 board						C2517	1-108-244-12	mylar	0.033μF	10%	50V
C2032	1-108-246-12	mylar	0.047μF	10%	50V	C2520	1-121-806-00	elect, nonpolar	10μF		16V
C2037	1-108-242-12	mylar	0.022μF	10%	50V	C2522	1-131-209-21	tantalum	0.1μF	10%	35V
C2040	1-108-359-12	mylar	0.027μF	10%	50V	C2523	1-108-239-12	mylar	0.01μF	10%	50V
C2041	1-108-239-12	mylar	0.01μF	10%	50V	C2526	1-131-209-21	tantalum	0.1μF	10%	35V
C2044	1-108-246-12	mylar	0.047μF	10%	50V	C2527	1-108-239-12	mylar	0.01μF	10%	50V
C2061	1-108-239-12	mylar	0.01μF	10%	50V	C2528	1-102-978-11	ceramic	220pF		50V
C2064	1-131-229-21	tantalum	33μF	10%	6.3V	C2529	1-108-237-12	mylar	0.0068μF	10%	50V
C2067	1-131-229-21	tantalum	33μF	10%	6.3V	C2530	1-108-360-12	mylar	0.039μF	10%	50V
C2069	1-131-229-21	tantalum	33μF	10%	6.3V	C2531	1-131-213-21	tantalum	0.47μF	10%	35V
C2070	1-131-229-21	tantalum	33μF	10%	6.3V	C2532	1-108-239-12	mylar	0.01μF	10%	50V
C2076	1-108-232-12	mylar	0.0033μF	10%	50V	C2533	1-108-239-12	mylar	0.01μF	10%	50V
C2077	1-108-239-12	mylar	0.01μF	10%	50V	C2536	1-108-240-12	mylar	0.015μF	10%	50V
C2078	1-108-239-12	mylar	0.01μF	10%	50V	C2537	1-108-232-12	mylar	0.0033μF	10%	50V
C2079	1-108-239-12	mylar	0.01μF	10%	50V	C2538	1-108-362-12	mylar	0.082μF	10%	50V
C2080	1-108-239-12	mylar	0.01μF	10%	50V	C2539	1-108-227-12	mylar	0.001μF	10%	50V
C2087	1-108-239-12	mylar	0.01μF	10%	50V	C2540	1-108-246-12	mylar	0.047μF	10%	50V
C2088	1-108-232-12	mylar	0.0033μF	10%	50V	C2541	1-108-244-12	mylar	0.033μF	10%	50V
C2089	1-131-216-21	tantalum	1.5μF	10%	35V	C2547	1-131-213-21	tantalum	0.47μF	10%	35V
C2092	1-131-216-21	tantalum	1.5μF	10%	35V	C2549	1-108-362-12	mylar	0.082μF	10%	50V
C2093	1-108-239-12	mylar	0.01μF	10%	50V	C2550	1-108-239-12	mylar	0.01μF	10%	50V
CV2001	1-141-167-11	trimmer	18pF			C2551	1-131-213-21	tantalum	0.47μF	10%	35V
CV2002	1-141-167-11	trimmer	18pF			C2553	1-131-209-21	tantalum	0.1μF	10%	35V
SV-10 board						C2556	1-131-209-21	tantalum	0.1μF	10%	35V
C2501	1-108-242-12	mylar	0.022μF	10%	50V	C2558	1-131-211-21	tantalum	0.22μF	10%	35V
C2502	1-108-242-12	mylar	0.022μF	10%	50V	C2562	1-108-239-12	mylar	0.01μF	10%	50V
C2503	1-108-244-12	mylar	0.033μF	10%	50V	C2563	1-108-239-12	mylar	0.01μF	10%	50V
C2504	1-108-244-12	mylar	0.033μF	10%	50V	C2564	1-108-244-12	mylar	0.033μF	10%	50V
C2505	1-108-237-12	mylar	0.0068μF	10%	50V	C2565	1-108-227-12	mylar	0.001μF	10%	50V
C2506	1-108-360-12	mylar	0.039μF	10%	50V	C2566	1-108-227-12	mylar	0.001μF	10%	50V
C2507	1-108-246-12	mylar	0.047μF	10%	50V	C2567	1-131-212-21	tantalum	0.33μF	10%	35V
C2508	1-129-879-11	polypropylene	0.047μF	5%	50V	C2568	1-108-237-12	mylar	0.0068μF	10%	50V
C2510	1-129-879-11	polypropylene	0.047μF	5%	50V	C2572	1-108-249-12	mylar	0.068μF	10%	50V
C2511	1-129-879-11	polypropylene	0.047μF	5%	50V						
C2512	1-129-879-11	polypropylene	0.047μF	5%	50V						
C2513	1-108-249-12	mylar	0.068μF	10%	50V						
C2514	1-131-213-21	tantalum	0.47μF	10%	35V						
C2515	1-108-227-12	mylar	0.001μF	10%	50V						
C2516	1-108-244-12	mylar	0.033μF	10%	50V						

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Ref. No.	Part No.	Description					Ref. No.	Part No.	Description				
DM-8 board						C4106	1-108-239-12	mylar	0.01μF	10%	50V		
C4003	1-131-219-21	tantalum	4.7μF	10%	35V	C4107	1-108-239-12	mylar	0.01μF	10%	50V		
C4004	1-131-219-21	tantalum	4.7μF	10%	35V	C4114	1-108-240-12	mylar	0.015μF	10%	50V		
C4005	1-108-246-12	mylar	0.047μF	10%	50V	C4115	1-108-232-12	mylar	0.0033μF	10%	50V		
C4009	1-108-242-12	mylar	0.022μF	10%	50V	C4116	1-108-232-12	mylar	0.0033μF	10%	50V		
C4012	1-108-242-12	mylar	0.022μF	10%	50V	MA-5 board							
C4013	1-108-246-12	mylar	0.047μF	10%	50V	C6001	1-108-244-12	mylar	0.033μF	10%	50V		
C4018	1-131-213-21	tantalum	0.47μF	10%	35V	C6002	1-108-227-12	mylar	0.001μF	10%	50V		
C4019	1-108-234-12	mylar	0.0047μF	10%	50V	C6003	1-108-244-12	mylar	0.033μF	10%	50V		
C4020	1-108-246-12	mylar	0.047μF	10%	50V	C6004	1-108-244-12	mylar	0.033μF	10%	50V		
C4021	1-131-213-21	tantalum	0.47μF	10%	35V	AP-1 board							
C4022	1-108-234-12	mylar	0.0047μF	10%	50V	C7103	1-102-959-11	ceramic	22pF		50V		
C4023	1-102-525-11	ceramic	68pF(CH)	5%	50V	C7104	1-102-816-11	ceramic	120pF		50V		
C4024	1-108-242-12	mylar	0.022μF	10%	50V	C7113	1-131-209-21	tantalum	0.1μF	10%	35V		
C4025	1-102-513-11	ceramic	18pF(CH)	5%	50V	C7114	1-101-881-11	ceramic	47pF		50V		
C4026	1-108-227-12	mylar	0.001μF	10%	50V	C7118	1-102-947-11	ceramic	10pF		50V		
C4027	1-108-242-12	mylar	0.022μF	10%	50V	C7203	1-102-959-11	ceramic	22pF		50V		
C4028	1-131-205-21	tantalum	2.2μF	10%	25V	C7204	1-102-816-11	ceramic	120pF		50V		
C4029	1-108-242-12	mylar	0.022μF	10%	50V	C7209	1-108-240-12	mylar	0.015μF	10%	50V		
C4030	1-108-242-12	mylar	0.022μF	10%	50V	C7213	1-131-209-21	tantalum	0.1μF	10%	35V		
C4032	1-108-242-12	mylar	0.022μF	10%	50V	C7214	1-101-881-11	ceramic	47pF		50V		
C4033	1-108-242-12	mylar	0.022μF	10%	50V	C7218	1-102-947-11	ceramic	10pF		50V		
C4043	1-108-242-12	mylar	0.022μF	10%	50V	C7224	1-108-242-12	mylar	0.022μF	10%	50V		
C4048	1-102-511-11	ceramic	13pF(CH)	5%	50V	C7225	1-108-234-12	mylar	0.0047μF	10%	50V		
C4049	1-108-227-12	mylar	0.001μF	10%	50V	AR-2 board							
C4051	1-108-242-12	mylar	0.022μF	10%	50V	C8005	1-108-357-12	mylar	0.012μF	10%	50V		
C4055	1-131-205-21	tantalum	2.2μF	10%	25V	C8006	1-108-234-12	mylar	0.0047μF	10%	50V		
C4063	1-108-242-12	mylar	0.022μF	10%	50V	C8007	1-108-234-12	mylar	0.0047μF	10%	50V		
C4066	1-108-242-12	mylar	0.022μF	10%	50V	C8008	1-129-707-11	polypropylene	0.0027μF	10%	630V		
C4068	1-109-166-11	dipped mica	680pF	5%	300V	C8010	1-141-076-11	trimmer	200pF				
C4078	1-131-237-21	tantalum	1.5μF	10%	25V	C8011	1-141-076-11	trimmer	200pF				
C4084	1-108-234-12	mylar	0.0047μF	10%	50V	C8054	1-108-357-12	mylar	0.012μF	10%	50V		
C4086	1-131-205-21	tantalum	2.2μF	10%	25V	C8055	1-108-234-12	mylar	0.0047μF	10%	50V		
C4088	1-131-205-21	tantalum	2.2μF	10%	25V	C8056	1-108-234-12	mylar	0.0047μF	10%	50V		
C4091	1-131-199-21	tantalum	10μF	10%	16V	C8057	1-129-706-11	polypropylene	0.0022μF	10%	630V		
C4099	1-108-239-12	mylar	0.01μF	10%	50V								

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Ref. No.	Part No.	Description				Ref. No.	Part No.	Description			
C8103	1-102-973-11	ceramic	100pF		50V	C11018	1-108-244-12	mylar	0.033μF	10%	50V
C8116	1-108-240-12	mylar	0.015μF	10%	50V	C11019	1-108-239-12	mylar	0.01μF	10%	50V
C8117	1-131-211-21	tantalum	0.22μF	10%	35V	C11021	1-108-239-12	mylar	0.01μF	10%	50V
C8119	1-108-359-12	mylar	0.027μF	10%	50V	C11022	1-131-215-21	tantalum	1μF	10%	35V
C8120	1-108-227-12	mylar	0.001μF	10%	50V	C11024	1-108-244-12	mylar	0.033μF	10%	50V
C8122	1-108-227-12	mylar	0.001μF	10%	50V	C11025	1-108-244-12	mylar	0.033μF	10%	50V
C8125	1-108-240-12	mylar	0.015μF	10%	50V	C11028	1-131-191-21	tantalum	47μF	10%	6.3V
C8203	1-102-973-11	ceramic	100pF		50V	C11030	1-131-191-21	tantalum	47μF	10%	6.3V
C8216	1-108-240-12	mylar	0.015μF	10%	50V	C11031	1-131-191-21	tantalum	47μF	10%	6.3V
C8217	1-131-211-21	tantalum	0.22μF	10%	35V	C11032	1-131-191-21	tantalum	47μF	10%	6.3V
C8219	1-108-242-12	mylar	0.022μF	10%	50V	C11036	1-131-191-21	tantalum	47μF	10%	6.3V
C8220	1-108-227-12	mylar	0.001μF	10%	50V	C11041	1-108-244-12	mylar	0.033μF	10%	50V
C8222	1-108-227-12	mylar	0.001μF	10%	50V	C11044	1-131-191-21	tantalum	47μF	10%	6.3V
PW-30 board						C11047	1-131-191-21	tantalum	47μF	10%	6.3V
C10001	1-123-119-11	elect	4700μF		50V	C11048	1-131-191-21	tantalum	47μF	10%	6.3V
C10007	1-123-067-11	elect	2200μF		25V	SY-33 board					
C10008	1-123-067-11	elect	2200μF		25V	C11501	1-131-228-21	tantalum	10μF	10%	6.3V
C10014	1-123-070-11	elect	2200μF		16V	C11502	1-131-190-21	tantalum	22μF	10%	6.3V
C10020	1-123-070-11	elect	2200μF		16V	C11504	1-108-246-12	mylar	0.047μF	10%	50V
C10021	1-123-067-11	elect	2200μF		25V	C11505	1-108-246-12	mylar	0.047μF	10%	50V
C10022	1-108-393-12	mylar	0.22μF	10%	100V	SY-35 board					
C10025	1-108-389-12	mylar	0.1μF	10%	100V	C13001	1-131-191-21	tantalum	47μF	10%	6.3V
C10026	1-108-389-12	mylar	0.1μF	10%	100V	C13002	1-119-367-11	elect	1μF		50V
C10027	1-108-389-12	mylar	0.1μF	10%	100V	C13003	1-119-352-11	elect	100μF		10V
C10029	1-108-393-00	mylar	0.22μF	10%	100V	C13005	1-119-218-11	elect	10μF		50V
C10030	1-108-393-00	mylar	0.22μF	10%	100V	C13006	1-119-367-11	elect	1μF		50V
SY-5 board						C13007	1-119-367-11	elect	1μF		50V
C11003	1-131-215-21	tantalum	1μF	10%	35V	C13008	1-108-246-12	mylar	0.047μF	10%	50V
C11004	1-131-215-21	tantalum	1μF	10%	35V	C13009	1-108-246-12	mylar	0.047μF	10%	50V
C11005	1-131-215-21	tantalum	1μF	10%	35V	SA-1 board					
C11006	1-131-215-21	tantalum	1μF	10%	35V	C16101	1-119-162-11	elect	10μF		25V
C11011	1-131-191-21	tantalum	47μF	10%	6.3V	C16102	1-119-162-11	elect	10μF		25V
C11012	1-131-191-21	tantalum	47μF	10%	6.3V	C16103	1-119-162-11	elect	10μF		25V
C11013	1-131-191-21	tantalum	47μF	10%	6.3V	C16104	1-119-162-11	elect	10μF		25V
C11014	1-131-191-21	tantalum	47μF	10%	6.3V	C16105	1-119-162-11	elect	10μF		25V
C11015	1-131-191-21	tantalum	47μF	10%	6.3V						
C11016	1-131-191-21	tantalum	47μF	10%	6.3V						

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Ref. No. Part No. Description

SI-4 board

△C30001 1-130-159-11 metalized film 0.047μF

RL-2 board

C31002 1-131-195-21 tantalum 33μF 10% 10V

PC-2 board

△C32001 1-130-120-11 polypropylene 2.5 + 1.2μF 5% 300V

EC-1 board

C34001 1-131-195-21 tantalum 33μF 10% 10V

Frame

△C40001 1-130-160-11 metalized film 0.22μF 250V

CERAMIC FILTER

DM-8 board

CF4001 1-231-282-00 5.12MHz
CF4002 1-231-302-00 4.27MHz
CF4003 1-231-281-00 4.5MHz

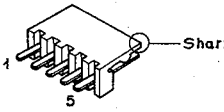
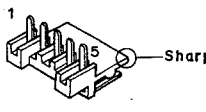
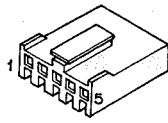
NOTE:

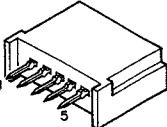
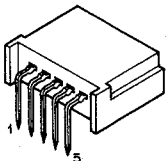
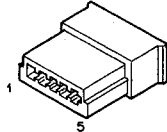
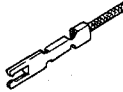
1. The shaded and **△**-marked components are critical to safety.
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CONNECTOR

Parts that are not listed in the "reference numbers order list" are shown in following table.
Reference numbers are omitted.

top-type receptacle	side-type receptacle	housing	plug	contact																																																
																																																				
<table><tr><td>2P</td><td>1-508-900-00</td></tr><tr><td>3P</td><td>1-508-901-00</td></tr><tr><td>4P</td><td>1-508-902-00</td></tr><tr><td>5P</td><td>1-508-903-00</td></tr><tr><td>6P</td><td>1-508-904-00</td></tr><tr><td>8P</td><td>1-508-905-00</td></tr><tr><td>10P</td><td>1-508-906-00</td></tr><tr><td>12P</td><td>1-508-949-00</td></tr></table>	2P	1-508-900-00	3P	1-508-901-00	4P	1-508-902-00	5P	1-508-903-00	6P	1-508-904-00	8P	1-508-905-00	10P	1-508-906-00	12P	1-508-949-00	<table><tr><td>2P</td><td>1-508-933-00</td></tr><tr><td>3P</td><td>1-508-934-00</td></tr><tr><td>4P</td><td>1-508-950-00</td></tr><tr><td>5P</td><td>1-508-935-00</td></tr><tr><td>6P</td><td>1-508-936-00</td></tr><tr><td>8P</td><td>1-508-937-00</td></tr><tr><td>10P</td><td>1-508-951-00</td></tr><tr><td>12P</td><td>1-508-997-00</td></tr></table>	2P	1-508-933-00	3P	1-508-934-00	4P	1-508-950-00	5P	1-508-935-00	6P	1-508-936-00	8P	1-508-937-00	10P	1-508-951-00	12P	1-508-997-00	<table><tr><td>2P</td><td>1-509-983-00</td></tr><tr><td>3P</td><td>1-509-984-00</td></tr><tr><td>4P</td><td>1-509-985-00</td></tr><tr><td>5P</td><td>1-509-986-00</td></tr><tr><td>6P</td><td>1-509-987-00</td></tr><tr><td>8P</td><td>1-509-988-00</td></tr><tr><td>10P</td><td>1-509-989-00</td></tr><tr><td>12P</td><td>1-561-056-00</td></tr></table>	2P	1-509-983-00	3P	1-509-984-00	4P	1-509-985-00	5P	1-509-986-00	6P	1-509-987-00	8P	1-509-988-00	10P	1-509-989-00	12P	1-561-056-00		1-509-982-00
2P	1-508-900-00																																																			
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5P	1-508-903-00																																																			
6P	1-508-904-00																																																			
8P	1-508-905-00																																																			
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12P	1-561-056-00																																																			

top-type receptacle		side-type receptacle		plug		
				housing	contact	
						
5P	1-509-633-00	5P	1-509-635-00	5P	1-508-670-00	1-535-083-00
10P	1-509-634-00	10P	1-509-636-00	10P	1-508-671-00	

Ref. No. Part No. Description

PW-30 board

CN104	1-508-625-XX	pin, 3P
CN105	1-508-625-XX	pin, 3P
CN106	1-508-625-XX	pin, 3P
CN107	1-508-625-XX	pin, 3P

SY-35 board

CN131	1-508-778-00	20P joint pin
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Frame

△ CN40001	1-509-546-00	receptacle, 3P, male; AC IN
CN40002	1-507-142-XX	jack, pin; LINE IN
CN40003	1-509-891-00	receptacle, BNC; VIDEO IN

Ref. No. Part No. Description

CN40004	1-508-945-00	receptacle, 7P, male; DUB IN
CN40005	1-509-095-00	receptacle, 8P, female; TV

CN40006	1-507-142-XX	jack, pin; LINE OUT
CN40007	1-507-251-XX	jack, JM-35, M-10;

AUDIO MONITOR

CN40008	1-509-891-00	receptacle, BNC; VIDEO OUT
CN40009	1-561-045-00	receptacle, 7P, female; DUB OUT
CN40010	1-560-002-00	standard aerial; RF OUT

CN40011	1-507-449-00	jack, JM-60, M-13S; HEADPHONES
CN40012	1-507-251-XX	jack, JM-35, M-10; MIC IN (CH-1)
CN40013	1-507-251-XX	jack, JM-35, M-10; MIC IN (CH-2)
CN40014	1-509-734-00	receptacle, 20P, female; REMOTE
CN40015	1-509-886-00	PCB connector; RF UNIT

NOTE:

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Ref. No.	Part No.	Description
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DIODE

MD-5 board

D1001	8-719-815-55	1S1555
D1002	8-719-815-55	1S1555
D1003	8-719-815-55	1S1555
D1004	8-719-815-55	1S1555
D1005	8-719-815-55	1S1555

D1006	8-719-815-55	1S1555
D1007	8-719-709-25	1S1925P
D1008	8-719-709-25	1S1925P
D1009	8-719-815-55	1S1555
D1011	8-719-815-55	1S1555

D1012	8-719-815-55	1S1555
D1014	8-719-815-55	1S1555

RP-2 board

D2001	8-719-815-55	1S1555
D2002	8-719-815-55	1S1555
D2003	8-719-815-55	1S1555
D2004	8-719-815-55	1S1555
D2005	8-719-815-55	1S1555

D2006	8-719-200-02	10E-2
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SV-10 board

D2501	8-719-815-55	1S1555
D2502	8-719-815-55	1S1555
D2505	8-719-156-07	RD5.6E-B

D2506	8-719-815-55	1S1555
D2507	8-719-815-55	1S1555
D2508	8-719-815-55	1S1555
D2509	8-719-815-55	1S1555
D2510	8-719-815-55	1S1555
D2511	8-719-815-55	1S1555

Ref. No.	Part No.	Description
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DM-8 board

D4001	8-719-815-55	1S1555
D4002	8-719-147-77	RD4.7E-C
D4003	8-719-709-25	1S1925P
D4004	8-719-709-25	1S1925P
D4005	8-719-709-25	1S1925P

D4006	8-719-815-55	1S1555
D4007	8-719-815-55	1S1555
D4008	8-719-815-55	1S1555
D4009	8-719-815-55	1S1555

MA-5 board

D6001	8-719-911-55	UO5G
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AP-1 board

D7101	8-719-815-55	1S1555
D7102	8-719-815-55	1S1555
D7103	8-719-815-55	1S1555
D7201	8-719-815-55	1S1555
D7202	8-719-815-55	1S1555

D7203	8-719-815-55	1S1555
D7204	8-719-815-55	1S1555

AR-2 board

D8001	8-719-200-02	10E-2
D8002	8-719-200-02	10E-2
D8003	8-719-133-00	RD3A
D8101	8-719-422-21	1T22AM
D8102	8-719-422-21	1T22AM

D8104	8-719-200-02	10E-2
D8106	8-719-200-02	10E-2
D8107	8-719-200-02	10E-2
D8108	8-719-200-02	10E-2
D8110	8-719-815-55	1S1555

D8201	8-719-422-21	1T22AM
D8202	8-719-422-21	1T22AM
D8204	8-719-200-02	10E-2
D8210	8-719-815-55	1S1555

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Ref. No.	Part No.	Description
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PW-30 board

D10001	8-719-510-10	S1RB10
D10002	8-719-510-10	S1RB10
D10003	8-719-162-07	RD6.2E-B
D10004	8-719-801-51	S5151R
D10005	8-719-851-51	S5151
D10006	8-719-162-07	RD6.2E-B
D10007	8-719-801-51	S5151R
D10008	8-719-851-51	S5151
D10009	8-719-143-07	RD4.3E-B
D10012	8-719-911-55	U05G
D10013	8-719-911-55	U05G
D10014	8-719-911-55	U05G
D10015	8-719-911-55	U05G
D10016	8-719-151-77	RD5.1E-C

SY-5 board

D11001	8-719-200-02	10E-2
D11002	8-719-200-02	10E-2
D11003	8-719-200-02	10E-2
D11004	8-719-815-55	1S1555
D11005	8-719-815-55	1S1555
D11006	8-719-815-55	1S1555
D11007	8-719-815-55	1S1555
D11008	8-719-815-55	1S1555
D11009	8-719-815-55	1S1555
D11010	8-719-815-55	1S1555
D11011	8-719-815-55	1S1555
D11012	8-719-815-55	1S1555
D11013	8-719-815-55	1S1555
D11014	8-719-815-55	1S1555
D11015	8-719-815-55	1S1555
D11016	8-719-815-55	1S1555
D11017	8-719-815-55	1S1555
D11018	8-719-133-00	RD3A
D11019	8-719-815-55	1S1555
D11020	8-719-815-55	1S1555

Ref. No.	Part No.	Description
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D11021	8-719-815-55	1S1555
D11022	8-719-815-55	1S1555
D11023	8-719-815-55	1S1555
D11024	8-719-815-55	1S1555
D11025	8-719-815-55	1S1555
D11026	8-719-139-07	RD3.9E-B
D11027	8-719-815-55	1S1555
D11028	8-719-815-55	1S1555
D11029	8-719-815-55	1S1555
D11030	8-719-130-00	RD3A
D11031	8-719-815-55	1S1555
D11032	8-719-815-55	1S1555
D11033	8-719-815-55	1S1555
D11035	8-719-815-55	1S1555
D11036	8-719-815-55	1S1555
D11037	8-719-815-55	1S1555
D11038	8-719-200-02	10E-2
D11039	8-719-200-02	10E-2
D11040	8-719-815-55	1S1555
D11041	8-719-200-02	10E-2
D11042	8-719-200-02	10E-2
D11043	8-719-815-55	1S1555
D11044	8-719-815-55	1S1555
D11045	8-719-815-55	1S1555
D11046	8-719-815-55	1S1555
D11047	8-719-815-55	1S1555
D11048	8-719-200-02	10E-2
D11051	8-719-815-55	1S1555
D11052	8-719-200-02	10E-2
D11053	8-719-815-55	1S1555
D11054	8-719-815-55	1S1555
D11055	8-719-815-55	1S1555
D11056	8-719-815-55	1S1555
D11057	8-719-815-55	1S1555

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Ref. No.	Part No.	Description
D11058	8-719-815-55	1S1555
D11059	8-719-815-55	1S1555
D11060	8-719-815-55	1S1555
D11061	8-719-815-55	1S1555
D11063	8-719-815-55	1S1555
D11064	8-719-815-55	1S1555
D11065	8-719-815-55	1S1555
D11066	8-719-815-55	1S1555
D11067	8-719-815-55	1S1555
D11068	8-719-815-55	1S1555
D11069	8-719-815-55	1S1555
D11070	8-719-815-55	1S1555
D11071	8-719-815-55	1S1555
D11072	8-719-815-55	1S1555
D11073	8-719-815-55	1S1555
D11074	8-719-156-07	RD5.6E-B

SY-33 board

D11501	8-719-815-55	1S1555
D11502	8-719-815-55	1S1555
D11503	8-719-143-07	RD4.3E-B
D11504	8-719-815-55	1S1555
D11505	8-719-815-55	1S1555

SY-35 board

D13001	8-719-815-55	1S1555
D13002	8-719-200-02	10E-2
D13003	8-719-200-02	10E-2
D13004	8-719-200-02	10E-2
D13005	8-719-815-55	1S1555
D13006	8-719-815-55	1S1555

SL-2 board

D21001	8-719-200-02	10E-2
D21002	8-719-200-02	10E-2
D21003	8-719-200-02	10E-2
D21004	8-719-200-02	10E-2
D21005	8-719-200-02	10E-2
D21006	8-719-200-02	10E-2
D21007	8-719-200-02	10E-2
D21008	8-719-815-55	1S1555

Ref. No.	Part No.	Description
SI-4 board		
D30001	8-719-200-02	10E-2
RL-2 board		
D31001	8-719-815-55	1S1555
D31002	8-719-162-07	RD6.2E-B
PC-2 board		
D32001	8-719-200-02	10E-2
EC-1 board		
D34001	8-719-931-09	EQB01-09
D34002	8-719-144-77	RD4.7E-C

DELAY LINE

MD-5 board

DL1002	1-415-096-00	0.1 ~ 0.3 μ S
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RP-2 board

DL2001	1-415-092-00	1H
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DM-8 board

DL4001	1-415-096-00	0.1 ~ 0.3 μ S
DL4002	1-415-153-00	0.2 μ S
DL4003	1-415-096-00	0.1 ~ 0.3 μ S

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Ref. No.	Part No.	Description
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FUSE

PW-30 board

△F10001	1-532-078-00	T1A
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△F10002	1-532-237-00	T3.15A
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△F10003	1-532-350-00	T4A
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△F10004	1-532-237-00	T3.15A
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△F10005	1-532-350-00	T4A
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△F10006	1-532-285-00	T1.25A
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△F10007	1-532-285-00	T1.25A
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△F10008	1-532-350-00	T4A
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△F10009	1-532-259-00	T1.6A
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△F10010	1-532-299-00	T5A
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Frame

△F40001	1-532-286-00	T2.5A
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Ref. No.	Part No.	Description
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FILTER

DM-8 board

FL4001	1-231-295-00	band-pass, 4.35MHz
FL4002	1-231-293-21	low-pass, 1MHz

DM-3 board

FL29601	1-231-191-00	feed through
FL29602	1-231-191-00	feed through

HEAD

Frame

H40001	A-6709-136-A	upper drum ass'y; RV-5
H40002	8-829-358-00	EPP150-5803; audio/CTL
H40003	8-825-635-00	EF18-59A; full erase

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Ref. No.	Part No.	Description		Ref. No.	Part No.	Description	
IC				SY-5 board			
MD-5 board				IC11001	8-759-632-02	M53202P	(SN7402N; TI)
IC1001	8-751-300-00	CX-130	(SONY)	IC11002	8-759-632-20	M53220P	(SN7420N; TI)
IC1002	8-751-300-00	CX-130	(SONY)	IC11003	8-759-632-20	M53220P	(SN7420N; TI)
IC1003	8-751-310-00	CX-131A	(SONY)	IC11004	8-759-632-00	M53200P	(SN7400N; TI)
IC1004	8-751-300-00	CX-130	(SONY)	IC11005	8-759-632-20	M53220P	(SN7420N; TI)
IC1005	8-751-330-00	CX-133A	(SONY)	IC11006	8-759-632-00	M53200P	(SN7400N; TI)
IC1006	8-751-300-00	CX-130	(SONY)	IC11007	8-759-632-00	M53200P	(SN7400N; TI)
RP-2 board				IC11008	8-759-632-00	M53200P	(SN7400N; TI)
IC2001	8-751-340-00	CX-134A	(SONY)	IC11009	8-759-632-20	M53220P	(SN7420N; TI)
IC2002	8-751-300-00	CX-130	(SONY)	IC11010	8-759-632-02	M53202P	(SN7402N; TI)
IC2003	8-751-300-00	CX-130	(SONY)	IC11011	8-759-632-02	M53202P	(SN7402N; TI)
SV-10 board				IC11012	8-759-632-10	M53210P	(SN7410N; TI)
IC2501	8-751-380-00	CX-138	(SONY)	IC11013	8-759-632-00	M53200P	(SN7400N; TI)
IC2502	8-751-430-00	CX-143A	(SONY)	IC11014	8-759-632-00	M53200P	(SN7400N; TI)
IC2503	8-759-430-10	AN301	(PANASONIC)	IC11015	8-759-632-00	M53200P	(SN7400N; TI)
IC2504	8-759-374-58	HA17458GS	(HITACHI)	IC11016	8-759-632-00	M53200P	(SN7400N; TI)
IC2505	8-759-374-58	HA17458GS	(HITACHI)	IC11017	8-759-632-02	M53202P	(SN7402N; TI)
DM-8 board				IC11018	8-759-632-02	M53202P	(SN7402N; TI)
IC4001	8-751-360-00	CX-136A	(SONY)	IC11019	8-759-633-07	M53307P	(SN74107N; TI)
IC4002	8-751-370-00	CX-137A	(SONY)	IC11020	8-759-205-14	TA7504S-R	(SONY)
IC4003	8-759-902-21	SN74LS221N	(TI)	IC11021	8-759-205-14	TA7504S-R	(SONY)
IC4004	8-751-450-00	CX-145	(SONY)	IC11022	8-759-205-14	TA7504S-R	(SONY)
IC4005	8-751-370-00	CX-137A	(SONY)	IC11023	8-759-205-14	TA7504S-R	(SONY)
IC4006	8-751-350-00	CX-135	(SONY)	SY-33 board			
AP-1 board				IC11501	8-759-632-02	M53202P	(SN7402N; TI)
IC7101	8-759-271-22	TA7122AP	(TOSHIBA)	IC11502	8-759-632-00	M53200P	(SN7400N; TI)
IC7102	8-759-271-22	TA7122AP	(TOSHIBA)	IC11503	8-759-632-02	M53202P	(SN7402N; TI)
IC7201	8-759-271-22	TA7122AP	(TOSHIBA)	SY-35 board			
IC7202	8-759-271-22	TA7122AP	(TOSHIBA)	IC13001	8-759-632-02	M53202P	(SN7402N; TI)
AR-2 board				IC13002	8-759-632-00	M53200P	(SN7400N; TI)
IC8101	8-759-271-22	TA7122AP	(TOSHIBA)	IC13003	8-759-633-07	M53307P	(SN74107N; TI)
IC8201	8-759-271-22	TA7122AP	(TOSHIBA)	IC13004	8-759-632-02	M53202P	(SN7402N; TI)
				IC13005	8-759-632-00	M53200P	(SN7400N; TI)

NOTE:

1. The shaded and  -marked components are critical to safety.
Replace only with same component as specified.

2. Parts printed in **Bold-Face** type are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in **Bold-Face** type will be processed, but allow for additional delivery time.

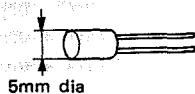
INDUCTOR

Parts that are not listed in the "reference numbers order list" are shown in following table.

Reference numbers are omitted.

MICRO INDUCTOR

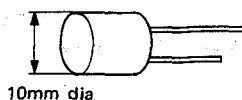
1 μ H through 470 μ H



Parts No. 1-407-□□□-XX							
Value	Parts No. -□□□-	Value	Parts No. -□□□-	Value	Parts No. -□□□-	Value	Parts No. -□□□-
1 μ H	178	4.7 μ H	186	22 μ H	161	100 μ H	169
1.2	179-00	5.6	187	27	162	120	170
1.5	180	6.8	188	33	163	150	171
1.8	181	8.2	189	39	164	180	172
2.2	182	10	157	47	165	220	173
2.7	183	12	158	56	166	270	174
3.3	184	15	159	68	167	330	175
3.9	185	18	160	82	168	390	176
						470	177

MICRO INDUCTOR

470 μ H through 33 mH



Part No. 1-407-□□□-XX							
Value	Parts No. -□□□-	Value	Parts No. -□□□-	Value	Parts No. -□□□-	Value	Parts No. -□□□-
470 μ H	191	1.5 mH	213	4.7 mH	202	15 mH	208
560	192	1.8	197	5.6	203	18	209
680	193	2.2	198	6.8	204	22	210
820	194	2.7	199	8.2	205	27	211
1 mH	195	3.3	200	10	206	33	212
1.2	196	3.9	201	12	207		

Ref. No. Part No. Description

MD-5 board

L1006 1-407-566-00 VAR 3.3 μ H

Ref. No. Part No. Description

RP-2 board

L2005 1-407-291-00 VAR 15mH
L2017 1-407-572-00 VAR 33 μ H
L2018 1-407-572-00 VAR 33 μ H
L2019 1-407-268-00 VAR 1.5mH

NOTE:

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Replace only with same component as specified.

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Ref. No.	Part No.	Description
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DM-8 board

L4002	1-407-838-00	VAR 150μH
L4007	1-407-288-00	VAR 4.7mH

AP-1 board

L7201	1-407-240-00	VAR 22mH
L7202	1-407-304-00	VAR 18mH
L7203	1-407-304-00	VAR 18mH

AR-2 board

L8002	1-407-285-00	VAR 1.5mH
L8003	1-407-285-00	VAR 1.5mH
L8102	1-407-240-00	VAR 22mH
L8202	1-407-240-00	VAR 22mH

MOTOR

DM-3 board

M29601	8-834-016-00	threading; D016
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Frame

M40001	8-839-018-10	AC; HCS-1134A2
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M40002	A-6709-131-A	drum ass'y; RD-32
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Ref. No.	Part No.	Description
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METER

Frame

ME40001	1-520-190-11	AUDIO CH-1
ME40002	1-520-190-11	AUDIO CH-2

LAMP

KY-1 board

PL21501	1-518-262-00	5V, 60mA ; PAUSE
PL21502	1-518-262-00	5V, 60mA ; AUTO OFF
PL21503	1-518-262-00	5V, 60mA ; STAND BY
PL21504	1-518-262-00	5V, 60mA ; FF
PL21505	1-518-262-00	5V, 60mA ; PLAY

PL21506	1-518-262-00	5V, 60mA ; REW
PL21507	1-518-262-00	5V, 60mA ; EJECT
PL21508	1-518-262-00	5V, 60mA ; REC
PL21509	1-518-262-00	5V, 60mA ; DUB

Frame

PL40001	1-518-224-00	14V, 80mA ; POWER
PL40002	1-518-134-XX	2V, 100mA ; AUDIO meter
PL40003	1-518-134-XX	2V, 100mA ; AUDIO meter
PL40004	1-518-134-XX	2V, 100mA ; AUDIO meter
PL40005	1-518-134-XX	2V, 100mA ; AUDIO meter
PL40006	1-518-263-00	23V, 130mA ; PHOTO

NOTE:

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Replace only with same component as specified.

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Ref. No.	Part No.	Description
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SOLENOID

Frame

PM40001	1-454-127-00	MAIN
PM40002	1-454-191-00	PINCH
PM40003	1-454-125-00	IDLER
PM40004	1-454-151-00	FF
PM40005	1-454-151-00	PLAY
PM40006	1-454-151-00	REW
PM40007	1-454-151-00	EJECT

TRANSISTOR

MD-5 board

Q1001	8-729-663-47	2SC1364
Q1002	8-724-375-01	2SC403C
Q1003	8-724-375-01	2SC403C
Q1005	8-724-375-01	2SC403C
Q1006	8-729-683-47	2SC1364
Q1007	8-761-622-00	2SC1636
Q1008	8-724-375-01	2SC403C
Q1010	8-729-663-47	2SC1364
Q1011	8-729-663-47	2SC1364
Q1012	8-724-375-01	2SC403C
Q1013	8-724-375-01	2SC403C
Q1014	8-724-375-01	2SC403C
Q1015	8-724-375-01	2SC403C
Q1016	8-724-375-01	2SC403C

Ref. No.	Part No.	Description
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RP-2 board

Q2001	8-724-375-01	2SC403C
Q2002	8-724-375-01	2SC403C
Q2003	8-724-375-01	2SC403C
Q2004	8-724-375-01	2SC403C
Q2005	8-724-375-01	2SC403C
Q2006	8-727-632-00	2SA706
Q2007	8-725-412-00	2SC1124
Q2008	8-729-663-47	2SC1364
Q2009	8-729-612-77	2SA1027R
Q2010	8-724-375-01	2SC403C
Q2011	8-724-375-01	2SC403C
Q2012	8-724-375-01	2SC403C
Q2013	8-729-663-47	2SC1364
Q2014	8-729-663-47	2SC1364
Q2015	8-724-375-01	2SC403C
Q2016	8-724-375-01	2SC403C
Q2017	8-724-375-01	2SC403C
Q2018	8-724-375-01	2SC403C
Q2019	8-724-375-01	2SC403C
Q2020	8-724-375-01	2SC403C
Q2021	8-724-375-01	2SC403C
Q2022	8-724-375-01	2SC403C
Q2023	8-724-375-01	2SC403C
Q2024	8-724-375-01	2SC403C
Q2025	8-724-375-01	2SC403C
Q2026	8-723-305-00	2SK43-5
Q2027	8-723-305-00	2SK43-5
Q2028	8-729-663-47	2SC1364
Q2029	8-724-375-01	2SC403C
Q2030	8-724-375-01	2SC403C
Q2031	8-724-375-01	2SC403C

NOTE:

1. The shaded and **A**-marked components are critical to safety. Replace only with same components as specified.

2. Parts printed in **Bold-Face** type are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in **Bold-Face** type will be processed, but allow for additional delivery time.

Ref. No.	Part No.	Description
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SV-10 board

Q2501	8-729-663-47	2SC1364
Q2502	8-729-663-47	2SC1364
Q2503	8-729-612-77	2SA1027R
Q2504	8-729-663-47	2SC1364
Q2505	8-729-663-47	2SC1364
Q2506	8-729-663-47	2SC1364
Q2507	8-729-663-47	2SC1364
Q2508	8-729-663-47	2SC1364
Q2509	8-729-663-47	2SC1364
Q2510	8-729-663-47	2SC1364
Q2511	8-729-663-47	2SC1364
Q2512	8-729-612-77	2SA1027R
Q2513	8-729-663-47	2SC1364
Q2515	8-729-663-47	2SC1364
Q2516	8-729-612-77	2SA1027R
Q2517	8-729-663-47	2SC1364
Q2518	8-729-612-77	2SA1027R
Q2520	8-729-663-47	2SC1364
Q2521	8-729-612-77	2SA1027R
Q2522	8-723-303-20	2SK43-3A
Q2523	8-729-663-47	2SC1364
Q2524	8-729-663-47	2SC1364
Q2525	8-629-663-47	2SC1364
Q2526	8-729-663-47	2SC1364
Q2527	8-729-663-47	2SC1364
Q2528	8-729-663-47	2SC1364
Q2529	8-729-663-47	2SC1364
Q2530	8-729-663-47	2SC1364

Ref. No.	Part No.	Description
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HF-3 board

Q3001	8-724-375-01	2SC403C
Q3002	8-724-375-01	2SC403C
Q3003	8-724-375-01	2SC403C
Q3004	8-724-375-01	2SC403C
Q3005	8-724-375-01	2SC403C

DM-8 board

Q4001	8-724-375-01	2SC403C
Q4002	8-729-663-47	2SC1364
Q4003	8-729-663-47	2SC1364
Q4004	8-729-663-47	2SC1364
Q4005	8-729-663-47	2SC1364
Q4006	8-729-663-47	2SC1364
Q4007	8-729-663-47	2SC1364
Q4008	8-724-375-01	2SC403C
Q4009	8-724-375-01	2SC403C
Q4010	8-724-375-01	2SC403C
Q4011	8-724-375-01	2SC403C
Q4012	8-724-375-01	2SC403C
Q4013	8-724-375-01	2SC403C
Q4014	8-724-375-01	2SC403C
Q4015	8-724-375-01	2SC403C
Q4016	8-724-375-01	2SC403C
Q4017	8-724-375-01	2SC403C
Q4018	8-724-375-01	2SC403C
Q4019	8-724-375-01	2SC403C
Q4020	8-724-375-01	2SC403C
Q4023	8-724-375-01	2SC403C
Q4024	8-724-375-01	2SC403C
Q4026	8-724-375-01	2SC403C
Q4027	8-724-375-01	2SC403C
Q4028	8-724-375-01	2SC403C
Q4029	8-724-375-01	2SC403C
Q4030	8-724-375-01	2SC403C
Q4031	8-724-375-01	2SC403C
Q4032	8-729-612-77	2SA1027R
Q4033	8-724-375-01	2SC403C

NOTE:

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Ref. No.	Part No.	Description
Q4034	8-724-375-01	2SC403C
Q4035	8-724-375-01	2SC403C
Q4036	8-724-375-01	2SC403C
Q4037	8-724-375-01	2SC403C

MA-5 board

Q6001	8-729-663-47	2SC1364
Q6002	8-729-317-12	2SA671

AP-1 board

Q7101	8-729-663-47	2SC1364
Q7102	8-729-663-47	2SC1364
Q7201	8-729-663-47	2SC1364
Q7202	8-729-663-47	2SC1364
Q7203	8-729-663-47	2SC1364
Q7204	8-729-612-77	2SA1027R

AR-2 board

Q8001	8-760-413-10	2SC1475
Q8002	8-729-663-47	2SC1364
Q8003	8-729-663-47	2SC1364
Q8004	8-729-663-47	2SC1364
Q8005	8-729-663-47	2SC1364
Q8052	8-729-663-47	2SC1364
Q8053	8-729-663-47	2SC1364
Q8054	8-729-663-47	2SC1364
Q8101	8-729-663-47	2SC1364
Q8102	8-729-663-47	2SC1364
Q8103	8-729-663-47	2SC1364
Q8104	8-729-663-47	2SC1364
Q8105	8-729-663-47	2SC1364
Q8106	8-729-663-47	2SC1364
Q8107	8-729-663-47	2SC1364
Q8108	8-729-663-47	2SC1364
Q8201	8-729-663-47	2SC1364
Q8202	8-729-663-47	2SC1364
Q8203	8-729-663-47	2SC1364
Q8204	8-729-663-47	2SC1364

Ref. No.	Part No.	Description
Q8205	8-729-663-47	2SC1364
Q8206	8-729-663-47	2SC1364
Q8207	8-729-663-47	2SC1364
Q8208	8-729-663-47	2SC1364

PW-30 board

Q10001	8-760-413-10	2SC1475
Q10002	8-729-663-47	2SC1364
Q10003	8-729-663-47	2SC1364
Q10004	8-760-413-10	2SC1475
Q10005	8-729-663-47	2SC1364

Q10006	8-760-413-10	2SC1475
Q10007	8-729-663-47	2SC1364
Q10008	8-729-468-43	2SC684
Q10009	8-729-663-47	2SC1364

SY-5 board

Q11001	8-729-663-47	2SC1364
Q11002	8-729-663-47	2SC1364
Q11003	8-729-663-47	2SC1364
Q11004	8-729-663-47	2SC1364
Q11005	8-729-663-47	2SC1364
Q11006	8-729-663-47	2SC1364
Q11007	8-729-663-47	2SC1364
Q11008	8-729-663-47	2SC1364
Q11009	8-729-663-47	2SC1364
Q11010	8-729-663-47	2SC1364
Q11011	8-729-663-47	2SC1364
Q11012	8-729-663-47	2SC1364
Q11013	8-729-663-47	2SC1364
Q11014	8-729-663-47	2SC1364
Q11015	8-729-663-47	2SC1364
Q11016	8-729-663-47	2SC1364
Q11017	8-729-663-47	2SC1364
Q11018	8-729-663-47	2SC1364
Q11019	8-729-663-47	2SC1364
Q11020	8-729-663-47	2SC1364

NOTE:

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Ref. No.	Part No.	Description
Q11021	8-729-663-47	2SC1364
Q11022	8-729-468-43	2SA684
Q11023	8-729-663-47	2SC1364
Q11024	8-760-335-10	2SC1474
Q11025	8-729-663-47	2SC1364
Q11026	8-729-468-43	2SA684
Q11027	8-729-663-47	2SC1364
Q11028	8-760-335-10	2SC1474
Q11029	8-729-663-47	2SC1364
Q11030	8-729-663-47	2SC1364
Q11031	8-729-663-47	2SC1364
Q11032	8-760-413-10	2SC1475
Q11033	8-729-612-77	2SA1027R
Q11034	8-729-468-43	2SA684
Q11035	8-729-663-47	2SC1364
Q11036	8-760-413-10	2SC1475
Q11037	8-729-316-12	2SC1061
Q11038	8-729-468-43	2SA684
Q11039	8-729-317-12	2SA671
Q11040	8-729-663-47	2SC1364
Q11041	8-729-663-47	2SC1364
Q11042	8-729-663-47	2SC1364
Q11043	8-729-663-47	2SC1364
Q11044	8-729-663-47	2SC1364
Q11045	8-729-663-47	2SC1364
Q11046	8-729-663-47	2SC1364
Q11047	8-729-663-47	2SC1364
SY-33 board		
Q11501	8-729-663-47	2SC1364
Q11502	8-729-663-47	2SC1364
SY-35 board		
Q13001	8-729-663-47	2SC1364
Q13002	8-760-335-10	2SC1474
Q13003	8-729-663-47	2SC1364
Q13004	8-760-335-10	2SC1474
Q13005	8-729-663-47	2SC1364

Ref. No.	Part No.	Description
Q13006	8-760-335-10	2SC1474
Q13007	8-729-663-47	2SC1364
Q13008	8-729-663-47	2SC1364
Q13009	8-729-663-47	2SC1364
Q13010	8-729-663-47	2SC1364
Q13011	8-729-663-47	2SC1364
SA-1 board		
Q16101	8-729-663-47	2SC1364
SL-2 board		
Q21001	8-729-663-47	2SC1364
Q21002	8-729-663-47	2SC1364
Q21003	8-729-663-47	2SC1364
Q21004	8-729-663-47	2SC1364
Q21005	8-729-317-12	2SA671
Q21006	8-729-468-43	2SA684
Q21007	8-729-316-12	2SC1061
Q21008	8-760-413-10	2SC1475
Q21009	8-729-612-77	2SA1027R
KY-1 board		
Q21501	8-729-663-47	2SC1364
Q21502	8-729-663-47	2SC1364
Q21503	8-729-663-47	2SC1364
Q21504	8-729-663-47	2SC1364
Q21505	8-729-663-47	2SC1364
RL-2 board		
Q31001	8-729-663-47	2SC1364
EC-1 board		
Q34001	8-729-663-47	2SC1364
Frame		
Q40001	8-765-290-02	2SC2072-2 ; T PHOTO TR
Q40002	8-765-290-02	2SC2072-2 ; S PHOTO TR
Q40003	8-729-311-51	2SC1115
Q40004	8-729-311-51	2SC1115
Q40005	8-729-311-51	2SC1115
Q40006	8-729-325-76	2SD257
Q40007	8-729-311-51	2SC1115

NOTE:

1. The shaded and -marked components are critical to safety.
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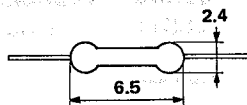
RESISTOR

Parts that are not listed in the "reference numbers order list" are shown in following table.

Reference numbers are omitted.

CARBON RESISTOR (1/4W)

± 5%, 1/4W, non-special type
1 Ω through 1 MΩ



Parts No. 1-246-□□□-00

Value	Parts No. -□□□-	Value	Parts No. -□□□-	Value	Parts No. -□□□-	Value	Parts No. -□□□-
1 Ω	401	33 Ω	437	1 kΩ	473	33 kΩ	509
1.1	402	36	438	1.1	474	36	510
1.2	403	39	439	1.2	475	39	511
1.3	404	43	440	1.3	476	43	512
1.5	405	47	441	1.5	477	47	513
1.6	406	51	442	1.6	478	51	514
1.8	407	56	443	1.8	479	56	515
2	408	62	444	2	480	62	516
2.2	409	68	445	2.2	481	68	517
2.4	410	75	446	2.4	482	75	518
2.7	411	82	447	2.7	483	82	519
3	412	91	448	3.0	484	91	520
3.3	413	100 Ω	449	3.3	485	100 kΩ	521
3.6	414	110	450	3.6	486	110	522
3.9	415	120	451	3.9	487	120	523
4.3	416	130	452	4.3	488	130	524
4.7	417	150	453	4.7	489	150	525
5.1	418	160	454	5.1	490	160	526
5.6	419	180	455	5.6	491	180	527
6.2	420	200	456	6.2	492	200	528
6.8	421	220	457	6.8	493	220	529
7.5	422	240	458	7.5	494	240	530
8.2	423	270	459	8.2	495	270	531
9.1	424	300	460	9.1	496	300	532
10 Ω	425	330	461	10 kΩ	497	330	533
11	426	360	462	11	498	360	534
12	427	390	463	12	499	390	535
13	428	430	464	13	500	430	536
15	429	470	465	15	501	470	537
16	430	510	466	16	502	510	538
18	431	560	467	18	503	560	539
20	432	620	468	20	504	620	540
22	433	680	469	22	505	680	541
24	434	750	470	24	506	750	542
27	435	820	471	27	507	820	543
30	436	910	472	30	508	910	544
						1 MΩ	545

Ref. No. Part No. Description

All resistors are in ohms.

MD-5 board

△R1005 1-206-641-11 metal 110 5% 2W

△R1007 1-206-641-11 metal 110 5% 2W

△R1023 1-217-373-21 fusible 0.68 10% ¼W

R1060 1-212-526-11 metal 510 1% ¼W

△R1106 1-206-641-11 metal 110 5% 2W

△R1124 1-211-417-11 carbon 22 5% ⅛W

RV1001 1-224-250-XX VAR 2.2k(B)

RV1002 1-224-251-XX VAR 4.7k(B)

RV1003 1-224-250-XX VAR 2.2k(B)

RV1004 1-224-251-XX VAR 4.7k(B)

RV1005 1-224-248-XX VAR 470(B)

RV1006 1-224-249-XX VAR 1k(B)

RP-2 board

△R2013 1-206-648-11 metal 220 5% 2W

△R2020 1-206-475-11 metal 33 5% 2W

△R2023 1-206-648-11 metal 220 5% 2W

△R2052 1-207-636-11 wirewound 100 10% 2W

△R2062 1-207-636-11 wirewound 100 10% 2W

Ref. No. Part No. Description

△R2087 1-211-933-11 carbon 47 5% ⅛W

△R2101 1-207-632-11 wirewound 47 10% 2W

△R2118 1-211-933-11 carbon 47 5% ⅛W

△R2133 1-211-409-11 carbon 10 5% ⅛W

△R2134 1-211-498-11 carbon 10 5% ⅛W

RV2001 1-224-248-XX VAR 470(B)

RV2002 1-224-249-XX VAR 1k(B)

RV2003 1-224-249-XX VAR 1k(B)

RV2004 1-224-251-XX VAR 4.7k(B)

RV2005 1-224-253-XX VAR 22k(B)

RV2006 1-224-253-XX VAR 22k(B)

RV2007 1-224-250-XX VAR 2.2k(B)

RV2008 1-224-250-XX VAR 2.2k(B)

RV2009 1-224-249-XX VAR 1k(B)

RV2010 1-224-250-XX VAR 2.2k(B)

RV2011 1-224-251-XX VAR 4.7k(B)

RV2012 1-224-251-XX VAR 4.7k(B)

SV-10 board

R2505 1-212-696-11 metal 56k 1% ¼W

R2510 1-212-695-11 metal 51k 1% ¼W

R2511 1-212-692-11 metal 39k 1% ¼W

R2512 1-212-684-11 metal 18k 1% ¼W

R2544 1-212-709-11 metal 200k 1% ¼W

R2580 1-244-866-11 carbon 510 5% ⅛W

△R2595 1-213-135-11 metal 220 5% 1W

R2599 1-212-694-11 metal 47k 1% ¼W

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Ref. No.	Part No.	Description
RV2501	1-224-254-XX	VAR 47k(B)
RV2502	1-224-253-XX	VAR 22k(B)
RV2503	1-224-254-XX	VAR 47k(B)
RV2504	1-224-255-XX	VAR 100k(B)
RV2505	1-224-253-XX	VAR 22k(B)
RV2506	1-224-253-XX	VAR 22k(B)
RV2507	1-224-254-XX	VAR 47k(B)
RV2508	1-224-256-XX	VAR 220k(B)
RV2509	1-224-254-XX	VAR 47k(B)

DM-8 board

△R4048	1-206-650-11	metal	270	5%	2W
R4049	1-244-865-11	carbon	470	5%	½W
△R4050	1-206-641-11	metal	110	5%	2W
△R4068	1-206-648-11	metal	220	5%	2W
△R4112	1-217-420-21	fusible	0.68	10%	½W
△R4134	1-211-417-11	carbon	22	5%	⅛W
R4137	1-244-865-11	carbon	470	5%	½W
R4138	1-244-865-11	carbon	470	5%	½W
△R4144	1-217-391-11	fusible	22	5%	¼W
R4157	1-244-865-11	carbon	470	5%	½W
RV4001	1-224-253-XX	VAR	22k(B)		
RV4002	1-224-249-XX	VAR	1k(B)		
RV4003	1-224-250-XX	VAR	2.2k(B)		
RV4004	1-224-250-XX	VAR	2.2k(B)		
RV4005	1-224-550-XX	VAR	220(B)		

Ref. No.	Part No.	Description
RV4006	1-224-254-XX	VAR 47k(B)
RV4007	1-224-254-XX	VAR 47k(B)
RV4008	1-224-249-XX	VAR 1k(B)
RV4009	1-224-249-XX	VAR 1k(B)
RV4012	1-224-249-XX	VAR 1k(B)
RV4013	1-224-134-XX	VAR 470k(B)
RV4014	1-224-250-XX	VAR 2.2k(B)

MA-5 board

△R6001	1-207-621-11	wirewound	1.5	10%	2W
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AP-1 board

R7109	1-224-252-XX	VAR	10k(B)		
R7112	1-224-250-XX	VAR	2.2k(B)		
R7209	1-224-252-XX	VAR	10k(B)		
R7212	1-224-250-XX	VAR	2.2k(B)		

AR-2 board

△R8001	1-217-391-11	fusible	22	5%	¼W
△R8051	1-217-391-11	fusible	22	5%	¼W
R8119	1-224-254-XX	VAR	47k(B)		
R8121	1-224-251-XX	VAR	4.7k(B)		
R8128	1-224-253-XX	VAR	22k(B)		
R8139	1-224-255-XX	VAR	100k(B)		
△R8141	1-217-387-11	fusible	10	5%	¼W
△R8142	1-217-387-11	fusible	10	5%	¼W
R8219	1-224-254-XX	VAR	47k(B)		
R8221	1-224-251-XX	VAR	4.7k(B)		
R8228	1-224-253-XX	VAR	22k(B)		

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Ref. No.	Part No.	Description
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PW-30 board

R10002	1-244-881-11	carbon 2.2k 5% ½W
R10006	1-224-248-XX	VAR 470(B)

△R10008	1-207-639-11	wirewound 330 10% 2W
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R10010	1-244-881-11	carbon 2.2k 5% ½W
R10016	1-224-248-XX	VAR 470(B)

R10022	1-224-248-XX	VAR 470(B)
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△R10026	1-217-397-11	fusible 68 5% ¼W
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R10028	1-213-144-11	metal 1.2k 5% 1W
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SY-5 board

R11033	1-244-829-11	carbon 15 5% ½W
R11052	1-210-817-11	carbon 1.5M 5% ¼W
R11061	1-210-817-11	carbon 1.5M 5% ¼W

△R11099	1-213-138-11	metal 390 5% 1W
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△R11104	1-213-138-11	metal 390 5% 1W
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△R11116	1-217-212-11	wirewound 10 10% 2W
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△R11123	1-217-212-11	wirewound 10 10% 2W
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SC-19 board

R19107	1-224-585-00	VAR 20k(A)
R19109	1-224-585-00	VAR 20k(A)

△R19111	1-213-127-11	metal 47 5% 1W
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SL-2 board

△R21001	1-207-657-11	wirewound 10 10% 3W
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Ref. No.	Part No.	Description
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DM-3 board

△R29601	1-207-907-11	wirewound 1.2 10% 2W
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SI-4 board

△R30001	1-213-132-11	metal 120 5% 1W
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Frame

R40001	1-224-665-00	VAR 500(B); COLOUR LOCK
R40002	1-224-720-00	VAR 100k(B); TRACKING

RELAY

RP-2 board

RY2001	1-515-198-00	12V 250Ω
RY2002	1-515-198-00	12V 250Ω

AR-2 board

RY8001	1-515-273-00	12V 250Ω
RY8101	1-515-273-00	12V 250Ω
RY8201	1-515-273-00	12V 250Ω

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Ref. No.	Part No.	Description
SWITCH		
SA-1 board		
S16001	1-516-462-00	lever slide; AUDIO MONITOR
S16002	1-516-462-00	lever slide; PGM'ED OPERATION
SC-19 board		
S19001	1-516-518-00	rotary ; AUDIO LIMITER
S19002	1-552-205-00	rotary ; INPUT SELECT
S19003	1-516-518-00	rotary ; SYSTEM SELECT
Frame		
S40001	1-516-520-00	micro ; MISS REC
S40002	1-516-520-00	micro ; STILL
S40003	1-516-520-00	micro ; CASSETTE IN
S40004	1-516-028-XX	micro ; CASSETTE UP
S40005	1-552-183-00	micro ; NORMAL UNTHREADING END
S40006	1-552-183-00	micro ; THREADING END
S40007	1-552-183-00	micro ; FR UNTHREADING END
S40008	1-516-028-XX	micro ; UNTHREADING SLACK
S40009	1-516-028-XX	micro ; FWD SLACK
△S40010	1-514-423-21	micro ; AC MOTOR
S40011	1-552-183-00	micro ; PINCH
△S40012	1-552-206-00	push ; POWER
S40013	1-548-514-XX	tape counter
S40014	1-552-183-00	micro ; STILL ADJ.

Ref. No.	Part No.	Description
TRANSFORMER		
MD-5 board		
T1001	1-425-879-00	band-pass 3.6 ~ 5.3MHz
T1002	1-425-880-00	burst amp 4.43MHz
RP-2 board		
T2001	1-425-724-00	hige freq.
T2002	1-425-724-00	hige freq.
T2003	1-425-384-00	TL
DM-8 board		
T4001	1-425-880-00	burst amp 4.43MHz
T4002	1-425-878-00	RF
T4003	1-425-878-00	RF
T4004	1-405-667-00	OSC
T4005	1-415-085-00	EQT-3
AR-2 board		
T8001	1-433-135-00	OSC
T8051	1-433-135-00	OSC
SA-1 board		
T16001	1-427-284-00	output
T16002	1-427-284-00	output
DM-3 board		
T29601	1-427-265-00	output ; THREADING MOTOR
Frame		
△T40001	1-442-994-00	power

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Ref. No. Part No. Description

THERMISTOR

MD-5 board

TH1001 1-800-200-00 S-3k Ω

SY-5 board

TH11001 1-800-198-XX S-1k Ω

CRYSTAL

MD-5 board

X1002 1-527-232-00 5.119166MHz

DM-8 board

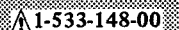
X4001 1-527-231-00 4.433618MHz

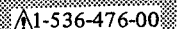
X4002 1-527-154-00 3.57954MHz

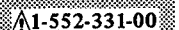
Ref. No. Part No. Description

MISCELLANEOUS

0-338-825-00 Condensation Sensor
1-509-437-00 Transistor Socket (TX-183S)
1-517-075-00 Socket, lamp; PHOTO
1-526-559-00 Transistor Socket (2SD291)

 1-533-148-00 Holder, fuse

 1-536-476-00 Terminal, 4P

 1-552-331-00 Voltage Selector

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13-4. PACKING MATERIAL AND ACCESSORY

Ref. No.	Part No.	Description
	▲1-534-819-00	Cord, power (for UK)
	▲1-551-258-00	Cord, power (for AEP)
	3-632-287-00	Bag, poly (for VO-2630)
	3-648-124-02	Cover, dust
	3-649-275-00	Spacer
	3-649-276-00	Cushion (R), upper
	3-649-426-00	Cushion (A), lower
	3-649-427-00	Cushion (B), lower
	3-649-429-00	Cushion (L), upper
	3-655-407-00	Carton, individual
	3-701-631-00	Bag, poly (for manual)
	3-770-434-11	Manual, instruction
	3-794-174-11	Indication, panel
	Standard products FA-20	

13-5. JIG

Ref. No.	Part No.	Description
	J-600-182-0A	Drum Eccentricity Gauge (3)
	J-600-183-0A	Drum Eccentricity Gauge (2)
	J-600-184-0A	Drum Eccentricity Gauge (1)
	J-600-193-0A	Drum Eccentricity Gauge (4)
	J-600-229-0A	Dihedral Adjusting Screw
	J-6001-085-A	Pinch Lever Adjustment Jig
	Y-2031-001-0	Cleaning Fluid
	2-034-697-00	Chamois
	3-702-213-01	38mm dia Torque Measurement Tape
	3-702-215-01	100mm dia Torque Measurement Tape
	3-702-216-01	Back Tension Adjustment Jig
	3-702-390-01	Eccentric Screwdriver (4φ)
	3-702-391-01	Eccentric Screwdriver (5φ)
	3-702-394-01	FWD Back Tension Measurement Jig
	3-702-397-01	Reel Table Height Adj. Jig
	3-702-398-01	Position Jig
	7-732-050-20	Tension Scale (50g Full Scale)
	7-732-050-30	Tension Scale (100g Full Scale)
	7-732-050-40	Tension Scale (200g Full Scale)
	7-732-050-50	Tension Scale (500g Full Scale)
	8-960-014-87	Alignment Tape RR4-7S SECAM Colour-bar
	8-960-015-01	Alignment Tape RR5-1S, NTSC
	8-960-015-61	Alignment Tape RR5-1S, PAL
	9-911-053-00	Thickness Gauge
	standard products	Head Demagnetizer HE-2 or HE-3
	standard products	Video Cassette Tape (KCA-60)
	J-600-906-0A	Screwdriver with gear

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